



Environmental and Social Impact Assessment: 300 MW Solar Power Plant, YSR (Kadapa) and Anantapur Districts, Andhra Pradesh

Developed by: SAEL Solar MHP1 300 MW Solar Power Plant

SAEL Industries Limited

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Acronyms

AoI	Area of Influence
APCD	Air Pollution Control devices
APPCB	Andhra Pradesh Pollution Control Board
ARF	Applicable Reference Framework
BMTPC	Building Materials and Technology Promotion Council of India
CEA	Central Electricity Authority
CGWA	Central Groundwater Authority
CGWB	Central Ground Water Brochure
CHA	Critical Habitat Assessment
CMS	Convention of Migratory Species
CO ₂	Carbon dioxide
CPCB	Central Pollution Control Board
CPCB	Central Pollution Control Board
CR	Critically Endangered
CSO	civil society organizations
CSR	Corporate Social Responsibility
CTE	Consent to Establish
CTO	Consent to Operate
DG	Diesel Generator
DPR	Detailed Project Report
EAAAs	Ecologically Appropriate Areas of Assessment
EBRD	European bank for Reconstruction and Development
EBRD	European bank for Reconstruction and Development
EHS	Environment, Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESP	Environmental and Social Policy
ESS	Environmental and Social Standards
FPIC	Free, Prior and Informed Consent
GIIP	Good International Industry Practice
GLC	Ground Level Concentration
GSI	Geological Survey of India
GSS	Grid Sub Station
HWA	Hazardous Waste Authorization
IBAs	Important Bird Areas
IBAT	Integrated Biodiversity Assessment Tool
IFC	International Finance Corporation
ILO	International Labour Organization
IMD	India Meteorological Department

KLD	Kilo Litres Per Day
KLD and cubic metre	1 KLD= 1 m ³
kV	Kilowatt
kWh	Kilowatt per hour
LC	Least Concern
Mbgl	Meters below ground level
MNRE	Ministry of New and Renewable Energy
MoEFCC	Ministry of Environment, Forest and Climate Change
MW	Mega Watt
NAAQ	National Ambient Air Quality
NABL	National Accreditation Board for Testing and Calibration Laboratories
NDB	New Development Bank
NFPA	National Fire Protection Authority
NOC	No Objection Certificate
O&M	Operation and Maintenance
OBC	Other Backward Caste
PM	Particulate Matter
PPA	Power Purchase Agreement
PPE	Personal Protective Equipment
PPM	Parts per million
PPM	Project-affected People's Mechanism
PS	Performance Standards
PUC	Pollution under Control
SC/ST	Schedule Caste/Schedule Tribe
SECI	Solar Energy Corporation of India
SIL	SAEL Industries Limited
SPV	Special Purpose Vehicle
SSMPL	SAEL Solar MHP1 Pvt. Ltd
STP	Sewage Treatment Plant- Effluent Treatment Plant
TL	Transmission Line
TPD	Ton Per Day
TPH	Ton Per Hours
TSDF	Treatment, Storage & Disposal Facility
VDR	Virtual Data Room

1 Introduction

SAEL Industries Limited (hereafter referred to as 'SAEL' or the 'Client'), is currently engaged in the development of a 300 MW solar power project (hereinafter referred to as 'the Project'). The Project entails the design, development, construction, operation, and maintenance of 300 MW AC solar photovoltaic power plant located in YSR (Kadapa) and Anantapur Districts, Andhra Pradesh, India (the Project). The power generated from the solar plant will be evacuated through a proposed transmission line (approximately 12-13 km from the site location), which will be connected to PGCIL's inter-state transmission system at the 220 kV sub-station in Kurnool-III, Andhra Pradesh connection point. The Project will sell electricity to SECI through a power purchase agreement for a period of 25 years from the scheduled commercial operation date. The Sponsor of the Project is SAEL who will also serve as the EPC Contractor and O&M Contractor of the Project. The modules for the Project may be supplied from the SAEL's manufacturing facility or procured from other domestic or international module suppliers.

In this regard, SAEL has engaged Environment & Social Advisors (E&S Advisors) to undertake Environmental and Social Impact Assessment (ESIA) of the Project against the objectives, principles, and requirements of AIIB's Environment and Social Framework and other applicable environmental and social requirements as per Applicable Reference Framework (ARF) as mentioned in **Section 1.2**. As part of the ESIA (hereinafter referred to as 'assignment'), a desk based preliminary environmental and social screening, followed by a scoping exercise has been conducted. This ESIA report identify and assess any potentially significant adverse environmental and social impacts associated with the Project's development and operation, and determine the measures needed to prevent, minimize, mitigate and compensate adverse impacts. The ESIA also identifies potential environmental and social opportunities, including those that would improve the environmental and social sustainability of the Project, in compliance with ARF.

1.1 Objective

The primary objective of the Environmental and Social Impact Assessment (ESIA) includes:

- Assess the potential environmental and social impacts of the Project, including those related to the environment, health, safety, involuntary resettlement, and indigenous peoples.
- Identify potential risks and vulnerabilities arising from Project activities including but not limited to key components of the Project, i.e., solar power plant, transmission line stretch, etc.
- Develop feasible and effective mitigation measures to address identified impacts and risks, with a special emphasis on safeguarding the environment, biodiversity, addressing involuntary resettlement, grievance redressal of stakeholders and respecting the rights of indigenous peoples.
- Ensure full compliance with the AIIB Environmental and Social Framework (2024), New Development Bank (NDB) Environment and Social Framework, 2016, World Bank EHS Guidelines (general and sector-specific), national environmental and social regulations, and international best practices.
- Plan and execute stakeholder engagement and consultation, including affected communities, indigenous peoples, CSOs/NGOs (if any), and relevant government authorities, to incorporate their concerns and feedback into the project design and implementation.

1.2 Applicable Reference Framework

Applicable reference framework for ESIA includes:

- AIIB Environmental and Social Framework (2024) including the Environmental and Social Policy (ESP), and Environmental and Social Standards (ESS)
- New Development Bank (NDB) Environment and Social Framework, 2016
- The Applicable Work Bank EHS guidelines:
 - General Environment, Health & Safety (EHS) guidelines, 2007
 - Guidelines for electric power transmission and distribution, 2007
- International Finance Corporation (IFC) and European bank for Reconstruction and Development (EBRD) Guidance Note on Workers' Accommodation: Processes and Standards, 2019
- IFC Performance Standards 6: Biodiversity Conservation and the Sustainable Management of Living Natural Resources including Guidance Note 6.
- All ILO conventions signed and ratified by the country, all ILO conventions covering core labor standards and all ILO conventions covering the basic terms and conditions of employment; and
- Other relevant GIIP.
- Relevant international conventions and protocols relating to environmental and social issues, as transposed into national legislation.

- Applicable local and national laws and regulations of India relating to concessions, land acquisitions and resettlement, labour and working conditions, public and occupational health and safety, ethnic minorities/Indigenous Peoples, and environmental protection.

1.3 Scope of Work

The scope of work for the ESIA includes:

- **Introduction:** Prepare comprehensive details of project background, justification for the solar power project as per development requirement, extent of the study, limitations of the study, structure of the report methodology and approach of data collection and literature review in the entire study.
- **Legislative, Regulation and Policy Consideration:** Outline the pertinent regulations and standards governing environmental quality, safety and health, social issues, including those that relate to land acquisition and involuntary resettlement, Indigenous People, protection of sensitive areas, protection of endangered species, siting, and land use control at the local and state levels. The national policies, acts, regulations, and guidelines as well as development partner's/project financier's policies, has also been reviewed.
- **Description of the Project:** Provide details of planned activities, support and associated facilities, construction plan, project layout, project components, site location maps, nearest sensitive receptors etc. with respect to the Project.
- **Description of the Environment:** Collect baseline data of the existing environmental conditions within project area and area of influence, which is expected to be used to describe the physical, biological, socio-economic, and/or physical, cultural resources in the project's area of influence. This data to be relevant to project location, design, construction, operation, or mitigation measures. Based on information available from literature, government and special studies or other sources, the ESIA to provide information on the environmental setting for the different types of physical, biological, and social-economic-cultural environments for the current situation, important trends, and predicted situation in the absence of the Project.
- **Project's Area of Influence (Aoi):** The Project's Aoi (based on the definition in IFC PS1) in the ESIA to be included:
 - Project activities and facilities that are directly owned, operated, or managed (including by contractors) by the Project Proponent and that are a component of the Project.
 - Impact from unplanned but predictable developments caused by the Project that may occur later or at a different location.
 - Indirect Project impacts on biodiversity or on ecosystem services upon which 'Affected Communities' livelihoods are dependent.
 - Associated facilities which are facilities that are not funded as part of the Project and that would not have been expanded if the Project did not exist and without which the Project would not be viable.
 - Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.
- **Baseline generation:** Baseline data collection to be collected to include:
 - Baseline data on the environmental characteristics of the study area, construction, resettlement sites (if any), inundation, floodplain, and biological features (habitat, vegetation, fisheries, birds, terrestrial fauna).
 - Physical environment: geology, topography, soils, climate, surface and groundwater hydrology, water availability, ambient air quality, noise, vehicular traffic, erosion and sediment loading, existing and projected pollution discharges and receiving water quality, water quality, availability, and adequacy vis-à-vis the requirements during different phases of the project life cycle, instances of flooding, siltation/erosion, natural hazards, etc.
 - Biological environment: ecology: flora and fauna, including rare or endangered species; sensitive natural habitats, including sanctuaries and reserves; and habitat types.
 - Physical or cultural resources (if any)
 - Socio-economic environment: demographics, land use in the Project area, main sources of income, gender gaps, poverty levels, culture, religion, skills and education levels, social service provision, business environment, ethnic profile and existing vulnerabilities of project affected communities (gender disaggregated if possible)
 - Land: access requirements, land use, involuntary resettlement and / or negotiated land acquisition, details on land acquisition/ transfer (loss of lands, houses, livelihood, etc.), and resultant involuntary resettlement extent; review of the land take/lease process to assess any legacy or current/existing issues (like informal settlers, livelihood dependence, other usage etc.) on the allotted land with regard to compliance with AIIB ESP ESS2 and AIIB's requirements regarding Negotiated Land Acquisition (i.e. willing buyer/seller)
- **Desktop Critical Habitat Screening (completed during E&S Screening and Scoping):** Conduct a desk based Critical Habitat Screening to understand the presence of ecologically sensitive species in and around the proposed project location which may trigger for a Critical Habitat. E&S Advisors has undertaken following steps to achieve the goal:
 - Screen the site using Integrated Biodiversity Assessment Tool (IBAT) data
 - Identify the candidate critical habitat-qualifying species

- Define one or more Ecologically Appropriate Areas of Assessment (EAAAs)
- Assess the importance of EAAAs for potential CH-qualifying species and for threatened ecosystems
- Assess whether the Project area is likely to have any features which would make the area particularly evolutionarily important
- Assess the presence of protected areas and internally recognised areas within the Project Area of Influence
- Provide a desktop assessment of Natural Habitat
- Identify biodiversity field survey priorities
- **Analysis of Alternatives:** Alternative approaches to meeting the purpose and need for the proposed project site include alternative siting, alternative configuration on the site, designing, constructing, operating the project firstly to avoid and prevent, or secondly to reduce or minimize adverse or improve beneficial environmental or socioeconomic impacts. The ESIA to assess, as appropriate the impacts of a range of representative reasonable and technically feasible alternatives as well as the proposed project. The alternatives to the project have included a “No Action” alternative, indicating what would happen in the absence of the proposed project as well as consideration of best practices that may not otherwise have been incorporated in the proposed project. Other alternatives should be developed as needed to address significant issues with the study. All project key alternatives that are reasonable and feasible and meet the purpose and need for the proposed project to be identified in this section and evaluated in the ESIA as appropriate.
- **Impact and Risk Assessment:** Identify and analyse potential impacts and risks resulting from project’s construction, operation, and decommissioning phases. Assess likely significant environmental and social effects of the development, which should cover the direct effects and any indirect, induced, cumulative short, medium, and long-term permanent and temporary, positive, and negative effects of the development.
- **Risk Assessment and Emergency Response:** Analysis of the likelihood of exceeding the economic, social, and environmental consequences at the project site. Indicate vulnerability of the exposed elements and the risk may be caused by man or nature. An occupational/community health safety management plan along with emergency response plan against emergency events during construction and operation phase of the project to be prepared as part of the ESIA.
- **Stakeholder Consultation & Information Disclosure:** ESIA to describe the consultation and participation mechanisms adopted and consolidate the regulatory and lender compliance requirements into a consultation and information disclosure plan, including the activities undertaken to disseminate project information and engage stakeholders. This section, in addition to the Plan, shall include a summary of the results of consultations with affected persons, the host communities, and other stakeholders, and the project’s response to satisfactorily address the concerns raised will be reported. Special attention to be given to the needs and concerns of vulnerable groups, including women, the poor, ethnic minorities, and Indigenous Peoples in the project area.
- **Grievance Redress Mechanism:** Provide description of the grievance redress framework/mechanisms (both informal and formal channels), setting out the time frame and mechanisms for i) resolving complaints about environmental and social performance; and ii) worker/contractor related grievance.
- **Mitigation and Management Measures and Monitoring:** Develop Environmental and Social Management and Monitoring Plan to prevent, mitigate and monitor each impact identified in the ESIA. Mitigation measures to be proposed for avoiding, as far as possible, any adverse impacts due to proposed development. Shall include quantification (wherever required) of mitigation methods.

1.4 Approach and Methodology

The approach and methodology utilized for the ESIA study has been described in the relevant sections, and summarised below:

1.4.1 Project Kick off

E&S Advisors conducted a kick-off meeting with SAEL, the project implementation team, and AIB prior to the site reconnaissance visit. During the meeting, the discussion focused on the expectations for this assessment, including the scope of work, deliverables timeline, and the methodology to be followed.

1.4.2 Desk Based Documents Review

E&S Advisors undertook a desk-based review of the Project to identify any environmental, social, and ecological sensitivities around the Project Site. The desk-based review includes:

- Review of the available secondary information on the solar project
- Applicable national and state level regulations for the project
- Google imagery-based review of the project location and availability of E&S sensitivities
- Review of the available secondary information on the physical environment of the study area

- The Integrated Biodiversity Assessment Tool (IBAT) serves to evaluate the ecological sensitivity of a prospective location and generates a list of species found within a 50-kilometer radius. Additionally, it identifies potential critical habitat concerns by assessing proximity to migration routes, legally protected zones, and key biodiversity areas.
- The ebird.org database offers a geographically referenced catalog of identified bird species within a specific geographical region. The ebird.org database was employed to verify the presence or absence of bird species within the EAAA.
- The inaturalist.org database is an online platform dedicated to citizen science and nature enthusiasts. It allows users to upload, share, and identify observations of plants, animals, and other organisms from around the world. The database was used to trace the presence/absence of all the ecologically sensitive species reported from the EAAA.
- The IUCN Red List (online Version) assesses species' conservation status by categorizing them based on a range from Critically Endangered (CR) to Least Concern (LC). This classification relies on an analysis of factors such as their worldwide distribution, population size, population decline trends, and external pressures on the species. As part of this categorization, this screening also includes information about the global distribution and habitat preferences of the species.
- Bird Life Data Zone: Bird Life International curates a database of Important Bird Areas (IBAs) which offers a comprehensive record of species located within these specified regions. It assesses the habitat sensitivity and highlights migratory, congregatory, and endangered species within these areas. Furthermore, the presence of an IBA in proximity to a project is considered a significant indicator of critical habitats.

1.4.3 Scoping Site Visit

The scoping site visit was conducted at the project site for one (1) day on 02 May 2024 to confirm the key landmarks and features identified in the screening exercise and identify preliminary environmental, social, and ecological impacts associated with the project. The visit also identified locations for environmental baseline (primary) monitoring at the site. The visit was undertaken by the consultant to ensure comprehensive coverage of environmental, ecological and social aspects of the project.

The primary focus of this visit was to gain a deeper understand the site's settings, environmental, ecological and social sensitivities with respect to the project and its associated facilities, as well as to identify relevant stakeholders. A preliminary stakeholder mapping was also undertaken, to identify the key stakeholders, who would be need to be consulted during the various stages of the project. Throughout this process, secondary data relevant to the study was also gathered.

1.4.4 Scoping Assessment

The scoping assessment was undertaken, which involved consolidating the information gathered during the preliminary E&S screening and site visit to identify the key receptors. These receptors were assessed against the Project activities to determine those aspects that require further investigation and any gaps against the reference framework, that may require additional data collection.

1.4.5 Screening & Scoping Report

As an outcome of the screening and scoping exercise, scope for the ESIA has been defined, which included a detailed approach and methodology, including plan for primary environmental and social baseline data collection and impact identification. Screening and Scoping report was submitted in June 2024.

1.4.6 Detailed Site Assessment & Consultations

E&S Advisors team comprising of environment, biodiversity and social experts undertook a site visit during the month of June 2024 to understand the site setting, environmental and social sensitivities and to identify the relevel stakeholders.

The activities undertaken during the site visit has been summarized below:

- Site Reconnaissance and Identification of key social and environmental risks/receptors in the study area
- Consultation with representatives from SAEL to understand the Project and related facilities.
- Understanding of prevailing community engagement processes
- Understanding aspects of community health and safety, if any, linked to the proposed Project
- Understanding land-based impacts, livelihood impacts, issues of vulnerable groups, cultural heritage issues
- Understanding significance of impacts on biodiversity and natural resource management
- Consultation with local communities and held focused group discussions in the vicinity to understand their views and concerns about the Project.
- Environmental baseline data was collected through primary environmental monitoring and surveys within the study area using a National Accreditation Board for Testing and Calibration Laboratories (NABL) Accredited Lab

1.4.7 Environmental and Social Impact Assessment Reporting

The ESIA report has been prepared by E&S Advisors based on the site assessment, documents made available till 28.06.2024, by the client, consultation with representatives of SAEL and nearby communities and information available on public domain. The structure of the ESIA has been presented below:

- **Project Description:** An overview of the project location and its associated facilities, and resource requirement are presented based on the data provided by the client and information collected as part of the ESIA study
- **Applicable Reference Framework:** An overview of the applicable reference framework including the national and state level regulations, and applicable international standards, principles, and guidelines are presented as part of the ESIA study
- **Baseline Condition:** A detailed baseline condition of the project area presented has been based on secondary data available for the study area supplemented by the primary data collected and consultation during the consultation with stakeholders
- **Stakeholder Consultation and Analysis:** Details on profile of the stakeholder groups identified as part of the ESIA, their key interests and concerns and the way they may be involved in the project lifecycle have been provided.
- **Impact Assessment:** Based on the project details, outcomes of scoping exercise and baseline information collected, an assessment of impacts on the Environmental, Ecological and Social Components was undertaken which typically include:
 - Predicting and assessing the project's likely positive and negative impacts and assigning significance to each type of impact
 - Identifying mitigation measures and any residual negative impacts that cannot be mitigated.
 - Evaluation of risks and impacts associated with the proposed Project.
- **Environmental and Social Management, and Monitoring Plan:** Environmental and Social Management, and Monitoring Plan (ESMP) suggesting economically feasible technologies and procedures to minimize any impact on environment and social receptors throughout the project life cycle have been developed and presented as part of the ESIA.

1.5 Limitations

- As the project is in early stages of planning and land procurement is underway, information related to details of all the formal and informal land users could not be ascertained for the Solar Project and the transmission line. The detailed information on the same will be collected during the preparation of the Livelihood Restoration Plan (LRP).
- Project boundary is not yet finalized as the project is in land procurement stage, hence the tentative project boundary in KMZ shared by client has been utilized for the report.
- The land requirement details and alignment details for the transmission line are currently unavailable. These details are crucial for evaluating the project's feasibility, social and environmental impact, as well as for identifying potential conflicts with existing infrastructure and land use.
- According to the information provided by the local community and an examination of available secondary data, it has been determined that there are no civil society organizations (CSO) operating within the study area. Consequently, there have been no consultations or engagements conducted with such organizations as part of the Environmental and Social Impact Assessment (ESIA) process.
- The assessment of environmental and social risks is limited to the project information available at this stage, discussions with stakeholders, secondary data collected, consultations with the local community, and observations made during the site survey.
- The consultations undertaken as part of the ESIA were limited to the stakeholders who were available for consultation during the site visit, including the project site team. Mapping of the stakeholders has been carried out and they will be consulted during the preparation of the LRP.
- As the environmental monitoring was undertaken for a short duration, the report does not address seasonal variation in the environmental data.
- Ecological survey was conducted during the daylight hours (in non-migratory season) and thus the avifaunal and faunal activities recorded were restricted to diurnal hours only.

1.6 Structure of the Report

Chapter 1	Introduction (this section)
Chapter 2	Project Description
Chapter 3	Applicable Legislative Regulatory & Administrative Regime
Chapter 4	Environment & Social Baseline Conditions
Chapter 5	Stakeholder Identification & Engagement
Chapter 6	Impact Assessment & Mitigation Measures
Chapter 7	Environment & Social Management Plan
Chapter 8	Impact Summary & Conclusion
Appendix 1	Documents Reviewed
Appendix 2	Project Schedule
Appendix 3	Photolog
Appendix 4	Grievance Redressal Mechanism
Appendix 5	Livelihood Restoration Framework (LRF)
Appendix 6	Traffic Management Plan
Appendix 7	Gender Action Plan
Appendix 8	Contractor and Supplier Management
Appendix 9	Supply Chain Undertaking on Labour and Working Condition
Appendix 10	POSH Policy
Appendix 11	Workers' Accommodation Management Plan
Appendix 12	Human Rights Impact Assessment
Appendix 13	Government of A.P. Notification for Renewable Projects;
Appendix 14	Sample Lease Deed Agreement
Appendix 15	CTUI Intimation Letter for Connectivity
Appendix 16	Floral diversity of the study area
Appendix 17	Herpetofauna diversity from the study area
Appendix 18	Avifaunal diversity from the study area
Appendix 19	Mammals from the study area

2 Project Description

This section provides a description of the proposed project, in terms of location, associated facilities, site settings, resource requirement, land details and status of the project.

2.1 Project Overview

M/s SAEL Solar MHP1 Pvt. Ltd (SSMPL) is a privately held company engaged in power generation. It operates as a subsidiary of SAEL Industries Limited (SIL), which is promoted by SAEL Limited (SAEL). SSMPL has embarked on the development of a 300 MW Solar Power Project in Koduru village, Kondapuram tehsil, YSR District and Bodaipalle village, Tadipatri tehsil, Anantapur District in Andhra Pradesh. SAEL land team has identified approximately 1881.32 acres of land for the Solar plant site, out of which ~1500 acres will be procured for the project site, and it will be acquired through lease for the entire duration of the Power Purchase Agreement (PPA) which is executed between M/s SAEL Solar MHP1 Private Limited and the Solar Energy Corporation of India Limited. M/s SAEL Solar MHP1 Pvt. Ltd was awarded the project through a reverse bidding process based on tariff considerations.

The salient features of the project are presented in **Table 2-1** and the Project layout is presented in **Figure 2:1**.

Table 2-1 Salient Features of the 300 MW Solar Power Plant

Sr. No.	Components	300 MW Solar Power Plant
General Details		
1.	SPV Name	M/s SAEL SOLAR MHP1 PVT. LTD) (Hereinafter referred to as "Project SPVs)
2.	Project Capacity	300 MW
3.	Site coordinates	15.030029°N, 78.139211°E
4.	Site Location	The project site encompasses two distinct villages located in Andhra Pradesh, India, namely, <ol style="list-style-type: none"> 1. Koduru in Kondapuram Mandal, YSR District, and 2. Bodaipalle in Tadipatri Mandal, Anantapur District.
5.	Nearest Highway	State Highway NH 544F around ~4 km towards south direction.
6.	Nearest Railway Station	Tadipatri railway station located at an aerial distance of ~6 km from the project boundary towards Southwest direction.
7.	Nearest Airport	Cuddapah (CDP) Airport located at an aerial distance of 82 km from project boundary towards West-Southwest direction.
8.	Current Project Status	The project is currently under Pre-construction stage where land lease agreement and power purchase agreement has been executed between the SAEL Solar MHP1 Private Limited and SECI respectively. Power Purchase Agreement has been executed between SAEL Solar MHP1 Private Limited and Solar Energy Corporation of India Limited for the purchase of power from 300 MW solar power plant dated 5 January 2024.
9.	Commercial Operation Date	Tentatively December 2025
Project Component		
10.	Total PV Modules	605775(tentative) for 300 MW solar project
11.	Module Make	SAEL 630Wp Topcon
12.	Solar Technology	Photovoltaic (PV) System
13.	Mounting type	Horizontal Single Axis Tracker
14.	Module Cleaning Type	Dry robotic cleaning supplemented by wet cleaning (65% -70% dry cleaning and 30%-35% wet cleaning)
15.	Total Inverters	91

Sr. No.	Components	300 MW Solar Power Plant
16.	Inverter Make	Inverter Make-Sineng 3.3MW (Central Inv.)
17.	Transformers	2 Nos of 150/180 MVA
Power Transmission Details		
18.	Transmission Line type	Not available
19.	Transmission Line length	The project will install the transmission line of length ~12 km (since the pooling substation location is not yet confirmed and hence the transmission line length is tentative) between the pooling substation and the grid substation of 220KV Kurnool-III ISTS.
20.	Pooling Substation	Pooling substation will be constructed within Project boundary.
21.	Grid Substation	400 kV grid substation of Kurnool-III ISTS (15°03'00.29°N, 78°13'92.11°E) located at an aerial distance of ~12 km from the Project site towards the north direction.
22.	Power Purchase Agreement	The Power Purchase Agreement was signed between SAEL and SECI on 5 January 2024.
Additional Project Infrastructure		
23.	Additional Project Infrastructure	It is expected that separate storeroom, site office, scrap yard will be set up within the respective project boundary.
Project Land Details		
24.	Land Requirement for the project	SAEL land team has identified approximately 1881.32 acres of land for the Solar plant site, out of which ~1500 acres will be procured for the project. (refer to Table 2-2 for details).
E&S Sensitivities		
25.	Surface water bodies within 25 km radius	As per google earth imagery dated 13.03.2024 and site observations, there is a rainwater pond within the project boundary. However, as per the project site team, the rainwater pond will not be disturbed in course of project implementation and also the water from the pond will not be used for project purpose. Penna river is flowing at an aerial distance of 1.8 km from the project towards south direction.
26.	Groundwater Status	According to Dynamic Groundwater Resources of India, 2023 ¹ , Kondapuram mandal, YSR District and Tadipatri mandal, Anantapur District, where the proposed project is falling is categorized as safe in terms of Groundwater development ² and extraction ³ . Stage of Ground Water Extraction in Ananthpur and YSR Districts is 33.28% and 33.85% respectively which falls under " Safe " category as per the definition given in the footnote.
27.	Presence of National Park, Protected Area, or ecologically sensitive sites in near vicinity	There is no protected area ⁴ as well as Important Bird and Biodiversity Area (IBA) ⁵ within the proximity of 10 km. No protected area ⁶ as well as Important Bird and Biodiversity Area (IBA) ⁷ is present along the proposed transmission line route. The nearest protected area, Rajiv Gandhi National Park, is situated approximately 46 km east-southeast from the project site, while the closest IBA, Sri Lankamalleswaram Wildlife

¹ <https://cgwa-noc.gov.in/LandingPage/LatestUpdate/NCDGWR2023.pdf>

² Groundwater development refers to the ratio of the amount of groundwater extracted annually to the amount of groundwater available annually. It's a measure of how much groundwater is available for use.

³ The Central Ground Water Board (CGWB) classifies groundwater extraction levels as follows:

Safe: Less than 70% of groundwater extraction

Semi-critical: 70–90% of groundwater extraction

Critical: 90% of groundwater extraction

Over-exploited: More than 100% of groundwater extraction

⁴ http://wiienvs.nic.in/Database/Maps_PAs_1267.aspx

⁵ Rahmani A.R., Islam M.Z. and Kasambe R.M. (2016) *Important Bird and Biodiversity Areas in India: Priority Sites for Conservation (Revised and updated)*. Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International (U.K.), p. 1992 + xii.

⁶ http://wiienvs.nic.in/Database/Maps_PAs_1267.aspx

⁷ Rahmani A.R., Islam M.Z. and Kasambe R.M. (2016) *Important Bird and Biodiversity Areas in India: Priority Sites for Conservation (Revised and updated)*. Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International (U.K.), p. 1992 + xii.

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Sr. No.	Components	300 MW Solar Power Plant
		Sanctuary, lies approximately 73 km in the same direction. Dobbudapalle Reserve Forest is located about 2 km from the project boundary in Northeast direction.
28.	Presence of Indigenous People	The project area does not fall within the Schedule V areas as designated by the Ministry of Tribal Affairs, Government of India. Additionally, based on review of census records revealed that there are no Scheduled Tribe population in the project Village Koduru. The land identified for the project are Dry Agriculture land has remained unaffected by any form of human settlement, encroachment, grazing, or other human activities. Furthermore, the implementation of the project will not result in the loss of collective attachment to distinct habitats or ancestral territories by any communities or groups of Indigenous Peoples.
29.	Presence of common property usage or culturally sensitive areas within 5 km radius of the project	As confirmed during the site visit, there are no structures, common property resources, water bodies, structures bearing cultural importance were observed within the proposed solar plant site and SAEL had reported to avoid such cultural important places while considering the Transmission Line route. Based on the review of secondary data from Archaeological Survey of India (ASI) ⁸ and Google earth pro no cultural heritage falls inside the study area of 5 km radius. The nearest ASI Notified sites are located at the distance of ~8 km (Rameswara Swamy Temple, and Chintalarayasvami Temple Tadipatri)

Source: Site visit, Google Earth Imagery dated 30.10.2022 and data shared by Client

2.2 Project Location and Site setting

The solar project site will be developed in an area covering two villages namely (i) Koduru village, Kondapuram tehsil, YSR District, and (ii) Bodaipalle village, Tadipatri tehsil, Anantapur District in the state of Andhra Pradesh for a capacity of 300 MW solar project. The proposed project will be situated at an elevation ranging between 242m to 255m above mean sea level on flat to undulating agricultural land. The designated area for the project primarily covered with agricultural crops and trees, predominantly Neem, Tamarind and Acacia. Currently, sorghum and chickpea are being cultivated in the designated land parcels, characterized by a soil composition consisting mainly of a blend of sand and black soil within the region.

While the proposed project is spread across two villages, Koduru and Bodaipalle, the nearest settlements are located at (i) Konduru village located at ~55m from the boundary towards south direction, (ii) Murugampalli village located at ~40m from the boundary towards northeast direction, (iii) Bodaipalle village located at ~350m from the boundary towards southwest direction and (iv) K. Sirigepalle village located at ~550m from the boundary towards north direction. Additionally, a school (ZP High School) is also located at a distance of ~84m from the site towards south direction. Also, there is a temple, at the arial distance of ~150m in the south direction of the project boundary. As per the discussion with the land and project team, access to the school or temple will not be blocked, and the project fencing will be done accordingly.

During E&S Advisors site visit, approximately 100-120 trees (predominantly Neem, Tamarind and Acacia) were observed within the project boundary and as confirmed by SAEL, most of them will not be removed as they are close to the boundary. However, the tree-cutting permission will be acquired from the forest department after the completion of land procurement.

Murugampalli T – Koduru Road is also observed to be passing adjacent to the identified land parcels for the project. As per the discussion with the land team, it was reported that fencing for the project will be done, without disturbing the existing road. Few dirt road or tracks are also observed passing through the project, used by the nearby community.

The nallah was also observed within the project site running from west to east ultimately connecting the Penna River which is located at an aerial distance of ~1.8 km towards south direction of the project boundary. During E&S Advisors site visit, it was observed that the nallah as well as the Penna River stream appeared to be dried up. A small seasonal-water pond was also observed within the project area which as reported collects the rainwater, reportedly, not used for any applications. However, as per the project site team, the rainwater pond will not be disturbed in course of project implementation and also the water from the pond will not be used for project purpose.

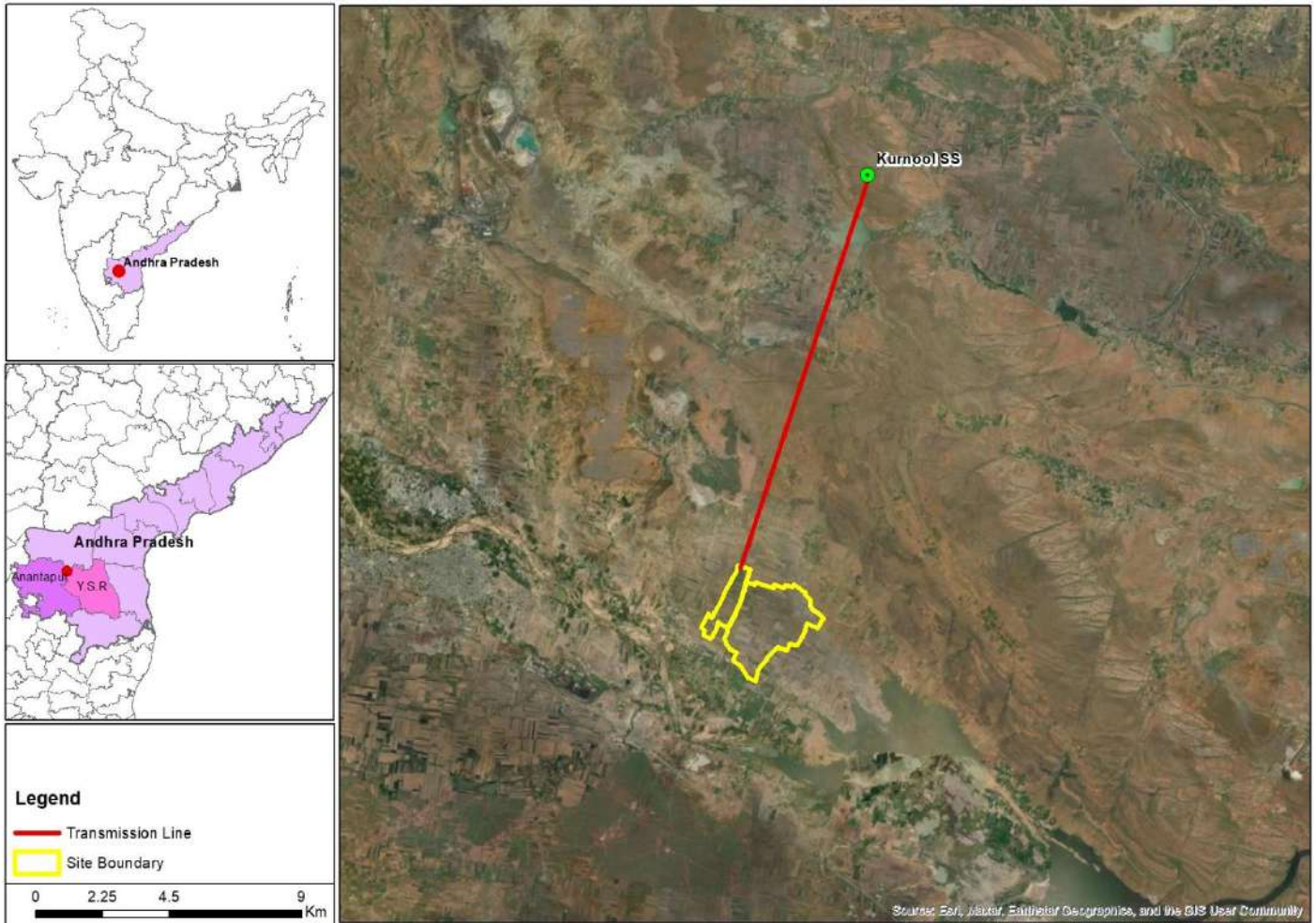
⁸ <https://asi.nic.in/>

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The proposed project is accessible via the Murugampalli-T. Koduru road which gets connected to State Highway at a distance of ~2.5 km towards south direction. No separate approach road is proposed to be developed and existing village road will be used during both construction and operation phases of the project.

The project location map has been presented in *Figure 2:1*.

Figure 2:1 Map showing Project Location



Source: Arc GIS Mapping

2.3 Project Schedule

The SAEL 300 MW Solar Project's schedule includes planning and design in 2023, followed by procurement and logistics in 2024. Construction and installation will take place in 2025, ensuring the timely setup of solar arrays and infrastructure. The project will undergo testing and commissioning in 2025, aiming for full operational status by the end of the FY 2025.

2.4 Project Transportation Route and planning

Access Routes and Connectivity

The SAEL Solar Plant project site is favourably positioned in proximity to key transportation routes, ensuring efficient access for construction and operational activities. The primary access route is State Highway NH 544F, located approximately 4 km to the south of the project site. This highway serves as a major arterial road, facilitating the movement of heavy machinery, equipment, and materials necessary for the project's development.

In addition to the State Highway, the Murugampalli T–Koduru Road runs adjacent to the identified land parcels designated for the solar plant. This road provides a secondary route for access and is instrumental in supporting the logistical requirements of the

project. The proximity of these two major roads enhances the overall connectivity of the project site, contributing to streamlined transportation planning.

Existing Infrastructure and Community Roads

The project team has conducted a thorough assessment of the existing road infrastructure within and around the project site. It has been observed that several dirt roads or tracks, currently utilized by the nearby community, traverse the project area. These tracks are essential for local mobility and community access. As such, the project planning includes provisions to ensure that these community roads remain unobstructed and accessible throughout the construction and operational phases.

In discussions with the land acquisition team, it has been confirmed that fencing for the project site will be installed in a manner that does not disrupt the existing road network. This approach ensures that the project infrastructure is secured without impeding local transportation routes or altering the current land use patterns. The fencing plan has been designed to respect the integrity of the Murugampalli T–Koduru Road and other adjacent pathways, thereby minimizing any potential impact on local traffic and community movement.

Access and Approach Roads

The proposed project site is primarily accessible via the Murugampalli-T. Koduru Road, which connects to the State Highway at a distance of approximately 2.5 km to the south. This route provides a direct link to the broader transportation network, facilitating efficient ingress and egress for project-related activities.

Given the robust connectivity offered by the existing road infrastructure, there is no requirement for the development of a separate approach road. The existing village road will be utilized for both the construction and operational phases of the project. This decision not only leverages the current infrastructure but also minimizes the environmental footprint and reduces the need for additional land acquisition.

Logistics and Transportation Planning

During the construction phase, detailed logistics planning will be undertaken to ensure the smooth transportation of materials, equipment, and workforce to the project site. The use of the State Highway and Murugampalli T–Koduru Road will be optimized to manage the delivery schedules and minimize any potential disruptions to local traffic.

Operational phase transportation will focus on regular maintenance activities, requiring periodic access to the site. The existing village road will continue to serve as the primary access route, ensuring that routine operations are conducted efficiently and with minimal impact on the surrounding community.

The transportation route and planning for the SAEL Solar Plant project have been meticulously designed to leverage existing infrastructure, minimize disruption to local communities, and ensure seamless logistics throughout the project lifecycle. The strategic use of State Highway NH 544F and Murugampalli T–Koduru Road, combined with careful planning of fencing and access routes, underscores our commitment to sustainable and community-conscious project execution.

2.5 Land Requirement for the project

This section provides an understanding of the land requirement of the project and the land procurement process, reviews the consideration of safeguards put in place for land take process for the project. The review compares adopted land procurement with safeguards to be adopted for land taken in accordance with the applicable reference framework of this assessment.

2.5.1 Land Team

SAEL had appointed M/s Saffrongrid Limited as a land aggregator for the proposed Solar power project, the land aggregator facilitates the land leasing process and ensure compliances of the applicable legal requirement involved in sourcing the land for the project. Land team consist of a five-member team from M/s. Saffrongrid Limited (Land Aggregator) and a Site Manager from SAEL team, were involved in land sourcing process at site. During the site visit, E&S Advisors team interacted with the SAEL land team and Land Aggregator to understand the land procurement process adopted by the project.

2.5.2 Brief of the land Leasing Process

SAEL Land Team along with M/s Saffrongrid Limited (Land Aggregator) involved in land leasing process. The procedure for land identification typically entails the engagement of a land aggregator to execute surveys and evaluations of land for the project,

identify land parcels aligning with the project's specifications and requirements, encompassing aspects like dimensions, proximity to GSS, Access Road, and alignment with the project's technical prerequisites, etc. After the preliminary land parcel identification, the land team initiates consultations with landowners of the selected land parcels to assess their inclination toward leasing their land for the Project.

In accordance with best practices outlined by the International Finance Corporation (IFC), meetings were organized with the local community, facilitated by the Gram Panchayat and Sarpanch. During the consultation with landowners, brief project related information, its associated benefits, and lease terms were transparently disclosed with all stakeholders. Based on the preliminary information on the land, internal Desk-Based Screening is carried out by the Land team. Followed by the land aggregator team collect relevant land documents for preparing Legal Due Diligence Report internal legal review.

It was informed that the SAEL will be following the "AP Renewable Energy Export Policy Amendment dated 13-09-2022", which entails the developers leasing private land for Renewable Energy projects and shall pay lease rent of INR.30,000/year/acre with escalation of 5% for every two years. For the project, the private land is being leased for a period of 29 years and 11 months. The land identified for the project is being procured based on the Willing Lessor Willing Lessee basis. Presently, a total of ~1881.32 acres of land has been identified, out of which ~1500 acres owned by ~350 landowners has been identified for procurement across Koduru village, Kondapuram Tehsil, YSR District (formerly known as Kadapa District). To date (30th August 2024), Agreement to Lease (ATL) was signed for 164.315 Acres of land and Lease agreement was signed for 1041.61 acres. The transmission line route connecting the PSS and GSS is in the initial phase of design, as on date of site visit no land parcels have been identified / leased out for the transmission line.

2.5.3 Transmission Line Easement Rights

In addition to leasing land for the solar power plant, the project will also acquire Right of Way (RoW) easement rights for developing transmission line. Easement rights allow the project to utilize specific portions of land for the installation and operation of the transmission infrastructure.

The power generated from the solar project is proposed to be evacuated through 220kV Double Circuit transmission line to the nearest existing Kurnool-III ISTS PSS 765/400kV/220KV substation. The total length of the proposed 220kV transmission line would be ~12.78 km. The Transmission line route alignment is yet to be finalized and the total length of the transmission Line may change post finalization of the transmission line route. The route alignment may change due to reasons like failed negotiations with property owners, avoidance of E&S sensitive locations, etc. which may potentially lead to extend or shorten the total TL line length.

The process of obtaining easement rights typically involve in negotiations with the landowners whose land will be affected by laying of transmission line. As on date of site visit, SAEL is in process of initial stage of finalizing the transmission line route alignment and procedures under Section 67 and Section 68 of the Electricity Act, 2003 such as newspaper publication, notice under, have not been undertaken.

As per information shared by project team, the external transmission line would be laid mostly on the private land. the compensation for obtaining easement right and damages sustained during laying transmission line would be based on the private negotiation and par with the "Ministry Of Power – Guidelines For Payment Of Compensation Towards Damages Regarding Right Of Way For Transmission Line". The Right of Way (RoW) required for the 220kV voltage transmission line would be 35 Meters, based on the tentative route length it was estimated that about 110 acres would be falling under the RoW. The trees / crops losses if any will be compensated as per the yield rate by SAEL.

2.5.4 Pooling Sub-Station and Storage Yard

The proposed Pooling Sub-Station and storage yard is to be developed within the project site and no addition land would be required beyond the designated solar power site. About 10 acres of land would be required for developing the PSS and storage yard, the required land is proposed to be leased by executing long term lease for a period of 29 years and 11 months.

2.5.5 Worker Accommodation

As the project is in its initial stage, hence the Engineering, Procurement, and Construction (EPC) contractor for the construction of solar power project has not been appointed yet. However, as per discussion with the project team, the project plans to accommodate the managerial level workforce including migrant workmen in the rented accommodations from the nearby villages and construction of labour camp is not necessitated.

2.5.6 Grid Substation (GSS)

The Grid Substation (GSS) serves as a crucial associate facility for the 300 MW project, playing an integral role in the power evacuation and grid integration process. The government has acquired a dedicated 80-acre plot of land for this newly constructed GSS, which is designed to support the project's connectivity needs. Currently, the construction of the specific bay, Bay No. 207, is underway and is expected to be completed by November 2024. This bay is exclusively allocated for the 300 MW project MHP-1 and operates at a voltage level of 220 kV. The connectivity for the project has been granted at the Kurnool-III Power Station (PS) terminal, ensuring that the generated power from the solar project will be effectively integrated into the grid through this dedicated bay. The total capacity for which connectivity is granted aligns with the project's requirements, facilitating a seamless connection and efficient power transmission.

2.5.7 Access Road

On basis of the consultation with the SAEL Land team, an access road of 2 km of already existing government road will be upgraded from the state highway 236 to reach the project site location.

2.5.8 Total Land Requirement for the Project

The total land requirement for the Project is provided below:

Table 2-2 Total Land Requirement for the Project

Project Component	Total Leased out Land Size (Acres)	Easement Rights (in Acres)	Total land requirement (Acres)	Land Category	Remarks
Solar Power Plant Parcel	~1500.00 acres	Not applicable	~1500.00 acres	Private Land	Based on the consultation with SAEL, it is understood that about 1881.32 acres of private land from Koduru Village have been identified, out of which ~1500 acres from 350 landowners will be procured for the proposed project. The required land would be leased by executing long term lease agreement.
Transmission Line (Connecting the Project and PSS)	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Based on discussion with SAEL during site visit, PSS is to be developed within the solar project site and does not require additional land. In total about 10 acres of land from the project site land would be used for developing the PSS.
External transmission line (220 kV) (Connecting PSS and GSS)	Not Applicable	~ 110 Acres	~ 110 Acres	Private Land	The power generated from the project is proposed to be evacuated through 220kV Double Circuit transmission line to the nearest existing Kurnool-III ISTS PSS 765/400kV/220KV substation. The total length of the proposed 220kV transmission line would be ~12.78 km. The Transmission line route alignment is yet to be finalized by SAEL and the total length of the transmission Line may change post finalization of the transmission line route.
Workers' Accommodation	Not Applicable	Not Applicable	Not Applicable	Not Applicable	As reported by project representatives, the project plans to accommodate the managerial level workforce including migrant workmen in the rented accommodations from the nearby villages and construction of labour camp is not necessitated .
Access Road	Not Available	Not Applicable	Not Applicable	Not Available	The project will utilize the pre-existing access road constructed for its operational needs and will not construct a new external access road. However, it is essential for the project to undertake the development of internal access roads within the designated power plant boundary. It is noteworthy that the internal access road development will not necessitate the allotment of additional land beyond the initially allocated area.

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2.5.9 Resource Requirement

The resource requirement during construction and operation phase of the Project has been summarised in **Table 2-3**.

Table 2-3 Resource Requirement

Sr. No.	Resource	Approximate Quantity	Source
1.	Manpower	<p>Construction Phase As reported, by the Project’s representative, the project will require ~200 contractual workers and ~15-20 on-roll employees to supervise the construction work.</p> <p>Operation Phase As reported, there will be ~ 30-50 Contractual workers and 10-15 on-roll employees employed during the operation and Maintenance phase.</p>	The information is shared by Project Representatives
2.	Water	<p>Construction Phase Water during construction phase will be required for civil work, domestic purpose and drinking purpose. As per information shared by Client, approximately 4500 KL of water for 300 MW project will be required for the entire civil work and 100 KL water will be required for dust suppression activities. Furthermore, for domestic and drinking purpose, approximately 300 KL water will be required for 200 workers at the 300 MW project during construction phase.</p> <p>Operation Phase During operation phase of solar power projects typically water is required for module cleaning, domestic and drinking purposes. As mentioned in Table 2-1, the project is exploring the feasibility to adopt 100% dry module cleaning, however, there is a potential that the project may adopt both dry as well as wet module cleaning for the 300 MW Project. As mentioned earlier tentatively 6,05,775 modules will be installed for the project. Considering, 1.5 litre water used per module, it is estimated that approximately 908 KL water will be required in one cycle during annual wet module cleaning. For domestic and drinking purpose, approximately 16 KLD water considering 80 litres/person/day⁹ for 30-50 workers, will be required.</p>	<p>Construction and Operation Phases As per the information shared, SAEL SOLAR MHP1 PVT. Project has planned to procure water through authorized third party, in tankers. Source of water, as per the current practice in the area could be from the surface water bodies (ponds/reservoirs, Lakes) from the nearby areas, not essentially from the Project village and this will be based on the availability of water sources during both construction and operation phases. For drinking purpose, water campers will be procured from local vendor. Vendor and exact source of water is yet to be finalized by the Project team. As reported, Project team will ensure that the vendor supplying water has all the necessary approvals and NOCs in place. Secondly, Project area fall under the “SAFE” category with respect to water availability as per the Central Ground Water Authority. As per the consultation, community in the project village and nearby areas, are not dependent on surface water sources, to meet their water requirement for domestic and drinking purpose and source ground water.</p>
3.	Construction Material	<p>Cement As per data shared by client, 8500 MT of cement will be required for each 300 MW</p> <p>Stone As per data shared by client, approximately 27,500 MT of stones will be required for each 300 MW project</p> <p>Steel As per data shared by client, approximately 700 MT of steel will be required for each 300 MW project</p> <p>Sand As per data shared by client, approximately 12,500 MT of sand will be required for each 300 MW project i.e.,</p>	The procurement of the construction material falls under the purview of EPC contractor which is yet to be decided. However, based on discussion with project team, it was reported that the construction material is expected to be procured from local suppliers

⁹ IFC Worker’s accommodation Guideline

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4.	Major Equipment	<p>JCB/ Excavator As per data shared by client, 2 no.s of Ajax mixture will be deployed for the 300 MW project</p> <p>Transit Mixture As per data shared by client, 8 no.s of transit mixtures will be deployed for the 300 MW Project</p>	The deployment of construction equipment falls under the purview of EPC contractor which is yet to be decided.
5.	Construction vehicles	As per data shared by client, it is understood that trucks and trolleys will be deployed on the access roads per month for initial 5-6 months for transportation of construction material at the Project site.	
6.	Solar Panels	During Operation Phase, approximately, 6,05,775(tentative) solar modules will be installed for the 300 MW solar power project. The Project has shortlisted a pool of ~5-10 suppliers including SAEL Solar Manufacturing Private Limited.	
7.	Power	<p>Construction phase During construction phase, power will be sourced from 1 nos. of DG sets of capacity less than 10kVA/ 25kVA.</p> <p>Operation Phase During the operation phase, power will be sourced from solar plant for auxiliary consumption and one DG set (capacity yet to be decided) will be set up for power back up.</p>	
8.	Fuel Requirement	<p>Construction Phase As per data shared by client, approximately 5,000 L of diesel will be required for DG sets and other construction machinery (as appropriate). Fuel will be procured from nearby petrol pump as and when required. Additionally, project may store limited quantity of fuel at the construction site area to meet immediate fuel requirement at the under-construction project.</p> <p>Operation Phase During operation phase fuel will be required for one DG set to be installed for power back up. The quantity of fuel for one DG set will be limited and it will be procured from nearby petrol pump as and when required. No fuel will be stored at project premises.</p>	
9.	Fire Safety and Security	<p>Construction Phase Based on discussion with RSPPL site team, it is understood that adequate firefighting system including fire extinguishers (ABC type), sand buckets, etc., will be installed at dedicated locations in compliance to National Fire Protection Authority (NFPA) fire safety standards and local fire authority requirements.</p> <p>Operation Phase During operation phase, firefighting system including portable fire extinguishers, fire buckets and automatic fire detection system are expected to be installed at the PV (Photo Voltaic) array, inverter stations, main control room and switchyard in compliance to National Fire Protection Authority (NFPA) fire safety standards and local fire authority requirements. In case of electrical utilities like transformers etc. the firefighting system is expected to be in compliance to Indian Standard (IS) 10028 i.e., Code of practice for selection, installation and maintenance of transformers, National Fire Protection Association (NFPA) 70 and 15 requirements</p>	

Source: Data shared by Client

2.5.9.1 Waste Management Practice for Proposed Project

The following types of wastes are anticipated from the construction and operation of the proposed project and its associated management practices has been mentioned provided in the **Table 2-4**.

Table 2-4 Waste Management at Proposed Project

Waste Type	Project Phase	Proposed Management Practice
Domestic solid waste including food waste from site office and labour accommodations during construction phase and site office,	Construction and Operation Phase	Domestic solid waste including food wastes will be disposed through local garbage collectors

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Waste Type	Project Phase	Proposed Management Practice
SCADA building during operation phase		
Construction and demolition wastes including debris, concrete etc.	Construction Phase	The project will generate construction wastes such as debris, cement etc from civil work. Construction debris generated on site will be used for backfilling and levelling and remaining wastes which cannot be reused will be disposed in line with Construction and Demolition Waste Management Rules, 2016.
Hazardous waste such as waste oil, lubricants, oil contaminated rags, empty containers of paints etc	Construction and Operation Phase	Hazardous waste will be stored in designated storeroom with secondary containment. The storage containers will be clearly marked and identified for their hazards. Within 90 days of their generation, hazardous waste materials will be sent to Andhra Pradesh Pollution Control Board (APCB)/Central Pollution Control Board (CPCB) authorized vendor for disposal at the Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF). Hazardous waste authorized vendor is yet to be identified by Project SPVs
Dry type or wet type batteries	Operation Phase	The batteries reaching end of life will be disposed of through authorised vendors as per the applicable regulations.
Sewage from site office, labour accommodations and SCADA building	Construction Phase and Operation Phase	Sewage from site office, SCADA room and labour accommodations and other areas will dispose through septic tank and soak tank as per specifications given in IS 2470: 1995 (Part I and II).
Biomedical wastes from first aid kits	Construction and Operation Phases	Biomedical wastes generated from project such as blood contaminated bandages, (if any) will be disposed through nearby hospital tie up. Expired medicines and ointments will be disposed through in line Biomedical Waste Management Rules, 2016
E-waste	Construction and Operation Phases	E-waste generated at site will be in the form of defected or broken solar modules, laptops, monitors, Control Processing Unit (CPU) etc., will be disposed as per applicable e-waste rules.
Scrap waste such as wires, scrap steel etc	Construction and Operation Phase	Scrap material generated onsite will be disposed through identified vendor.

3 Applicable Legislative, Regulatory and Administrative Regime

This section highlights the environmental and social regulations applicable to the proposed project:

3.1 National Administration Requirement

In India, the national level laws are formulated by Ministry of Environment Forests and Climate Change (MoEFCC), Ministry of Labour & Employment and state governments are required to consider these regulations as base level for implementation. The state Pollution Control Boards (SPCBs), State Labour Department, District Revenue Department are responsible for state level environmental, labour and land related regulations. A brief description of the relevant enforcement agencies both at central and state level with respect to the institutional framework is described in *SEQ* Table * ARABIC \s 1 below.

Table 3-1 Relevant Enforcement Agencies

Sr. No	Agency	Function
Central Level		
1	Ministry of Environment Forests and Climate Change (MoEFCC)	<p>The Ministry of Environment and Forests (MoEFCC), Government of India is responsible for the environment management at Union of India level. The specific functions of MoEFCC are as follows:</p> <ul style="list-style-type: none"> • Environmental policy planning • Effective implementation of legislation • Issuing guidelines under EP Act for environment protection • Monitoring and control of pollution through Central Pollution Control Board and State Pollution Control Boards • Environmental clearance for industrial and development projects covered under EIA Notification • Monitoring of compliance conditions stipulated in Environmental clearance through its regional offices • Promotion of environmental education, training, and awareness • Forest conservation, development, and wildlife protection; and • Protection of Coastal areas. <p>MoEFCC is responsible for the implementation and enforcement of the Environment Protection Act, 1986, and Rules issued under the Act, including the EIA notification. Under sections 3 and 5 of the EP Act, 1986, it retains enormous powers to issue directions in the interests of environment protection.</p>
2	Central Pollution Control Board	<p>The Central Pollution Control Board (CPCB) was formed for controlling water, air and noise pollution, land degradation, hazardous material, and waste management. The specific functions of CPCB are as follows:</p> <ul style="list-style-type: none"> • Prevent pollution of streams and wells • Advise the Central Government on matters concerning prevention, control and abatement of water and air pollution • Co-ordinate the activities of SPCB's and provide them with technical and research assistance • Establish and keep under review quality standards for surface and groundwater and for air quality • Planning and execution of national programme for the prevention, control, and abatement of pollution through the Water and Air Acts.
3	Central Electricity Authority (CEA)	<p>The Central Electricity Authority (CEA) is a statutory organization constituted under Section 3 of the repealed Electricity (Supply) Act, 1948, here in after replaced by the Electricity Act, 2003. Some of the functions performed by CEA include the following:</p> <ul style="list-style-type: none"> • Advise the Central Government on the matters relating to the national electricity policy, formulate short-term and perspective plans for development of the electricity system and coordinate activities of the planning agencies for the optimal utilization of resources to sub-serve the interests of the national economy and to provide reliable and affordable electricity to all consumers • Specify the technical standards for construction of electrical plants, electric lines, and connectivity to the grid • Specify the safety requirements for construction, operation and maintenance of electrical plants and electric lines • Promote and assist in the timely completion of schemes and projects for improving and augmenting the electricity system • Collect and record the data concerning the generation, transmission, trading, distribution, and utilization of electricity and carry out studies relating to cost, efficiency, competitiveness, and such like matters • Make public from time to time the information secured under this Act, and provide for the publication of reports and investigations

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Sr. No	Agency	Function
		Advise any State Government, licensees or the generating companies on such matters which shall enable them to operate and maintain the electricity system under their ownership or control in an improved manner and where necessary, in coordination with any other Government, licensee or the generating company owning or having the control of another electricity system; etc.
4	Central Ground Water Authority	<p>The Central Ground Water Authority (CGWA) was constituted in 1997 to regulate, control and manage groundwater development in the country, under the EP Act 1986. One of the main functions of CGWA is to regulate indiscriminate borewells in and withdrawal of groundwater and to issue necessary regulatory directions with a view to preserve and protect the groundwater.</p> <p>CGWA has declared certain areas of India as “notified areas” from the point of over-development of resource, or from groundwater quality point of view, or for registration of groundwater abstraction structures. In these “notified areas” further extraction is regulated to prevent the depletion of groundwater levels and deterioration of its quality.</p>
5	The National Green Tribunal (NGT)	<p>National Green tribunal was constituted in 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto. It is a specialized body equipped with the necessary expertise to handle environmental disputes involving multi-disciplinary issues. The tribunal will have jurisdiction over all civil cases relating to implementation of the following regulations:</p> <ul style="list-style-type: none"> • The Water Act, 1974 • The Water Cess Act, 1977 • The Forest Conservation Act, 1980 • The Air Act, 1981 • The Environment Protection Act, 1986 • The Public Liability Insurance Act, 1991; and • The Biological Diversity Act, 2002.
6	Ministry of Power	<p>The Ministry of Power is an Indian Government Ministry. The Ministry is charged with overseeing electricity production and infrastructure development, including generation, transmission, and delivery, as well as maintenance projects. Further, the ministry has issued the guidelines for payment of compensation towards damages regarding Right of Way (RoW) of transmission line.</p> <p>The guideline has proposed compensation to be paid for the base area in between the transmission tower (between four legs) and towards diminution of land value in the width of the RoW corridor due to laying of transmission line @85% and 15%, respectively of the land value as determined by the District Collector, or any authority based on circle rate/guideline value/stamp value/stamp act.</p>
State Level		
7	New & Renewable Energy Development Corporation of Andhra Pradesh Ltd.	<p>NREDCAP is the State Nodal Agency for implementation of all Renewable energy projects in AP with the following objectives.</p> <ul style="list-style-type: none"> • Generate electricity through renewable sources like wind and solar on decentralized manner. • Conserve energy in rural areas • Import & adopt viable technology & machinery in the areas of non-conventional energy sources & ensures post installation service • Impart training and to promote research and development in the field of non-conventional energy sources

Sr. No	Agency	Function
8	Andhra Pradesh Solar Power Corporation Private Limited (APSPCL)	<p>The principal objective of the organization is to develop solar parks and projects in the State of Andhra Pradesh. APSPCL is a Joint Venture Company between three government organisations namely Solar Energy Corporation of India (SECI), a Govt. of India Enterprise, Andhra Pradesh Power Generation Corporation Ltd (APGENCO), a Govt. of Andhra Pradesh Undertaking and New and Renewable Energy Development Corporation of Andhra Pradesh Ltd (NREDCAP), a State Govt. Company.</p> <p>The main objectives of the APSPCL is to</p> <ul style="list-style-type: none"> • Development of solar park and solar power project • Transmitting, manufacturing, supplying, selling of power • Lease of land and finance • Business management consultant
9	Andhra Pradesh State Pollution Control Board (APSPCB)	<p>The Government of Andhra Pradesh constituted the APPCB (Andhra Pradesh Pollution Control Board) on 24.01.1976 as per provisions under the Water (Prevention and Control of Pollution) Act, 1974 with a view to protect the environment, prevent and control the pollution of water, air, and land in the State of Andhra Pradesh, which is known for its agricultural and industrial significance in the country. The Board has been entrusted with the implementation of various Central Acts and relevant Rules for pollution control as notified from time to time.</p> <p>The functions of the APPCB include enforcing the provisions of the following Acts, Rules, and Directives issued by the Authorities from time to time</p>
10	The Board of Revenue in Andhra Pradesh	<p>The Department administers State Land and Revenue generation, survey and settlement apart from updating of Land records, provide financial assistance to allottees of surplus land, survey the tribal areas, maintain computerization of land records, registrations and transfer of property, etc.</p> <p>E-dhara computerization of Land records is managed Initiative by the Revenue Department. Use of Government wasteland to be made cultivable for modern technology and providing funds to aid Disaster management in case of earthquake or natural calamities, are some initiatives of the Department.</p> <p>In Andhra area the Board of Revenue was established in Madras State in 1786 with the sanction of the Court of Directors of East India Company. Consequent on the abolition of the erstwhile Board of Revenue, the functional Commissioners of Survey, Settlement & Land Records and Commissioner of Land Reforms & Urban Land Ceiling were created. The Chief Commissioner of Land Administration (CCLA) is the chief controlling authority for the revenue administration consisting of Revenue, Survey, Settlement & Land Records and Urban Land Ceiling Departments.</p>
11	Gram Panchayats	<p>The local Panchayats are empowered with management of local resources like forests, groundwater, common land and infrastructure like roads, buildings etc.</p>
12	Labour & Employment Department, Government of Andhra Pradesh	<p>The Department of Labour is responsible for formulation, implementation, and enforcement of the labour laws in the state of Andhra Pradesh. Decent Working Conditions and Improved Quality of Life of Workers, Ensuring India without Child Labour and Enhancing Employability on a Sustainable Basis. Formulating and Implementing Policies / Programmes / Schemes / Projects for Providing Social Security and Welfare, Regulating Conditions of Work, Occupational Health and Safety of Workers, Eliminating Child Labour, Promoting Harmonious Industrial Relations, Ensuring Enforcement of Labour Laws and Promoting Employment Services.</p> <p>The most important functions of the Commissionerate of Labour include maintaining peaceful atmosphere in the labour sector; ensure co-operation and healthy relation between employers and the employees, systematic implementation of labour legislation, enhancing welfare of workers through better policies and programmes.</p>
13	Private Security Agency, Andhra Pradesh	<p>It is a state government body, with the aim to establish providing licenses to the private security agencies under the Private Security Agencies (Regulations) Act, 2015. To provide:</p> <ul style="list-style-type: none"> • Better services to the PSARA Controlling Authorities, private security agencies as well as to the citizen • Quick implementation of government policies from time to time. • Improved/transparent image of Government & Department

Sr. No	Agency	Function
		<ul style="list-style-type: none"> Instant access to information related to private security agencies <p>To improve the quality-of-service delivery to the citizen and the quality of the work environment of the PSARA licensing authorities.</p>
14	Directorate Industrial Safety and Health Department (DISH) and Labour Department	<p>The Directorate Industrial Safety and Health Department enforces the provisions of Factories Act 1948 and State Factories Rules and the rules made there under to ensure the safety health and welfare of the workers. It also plays a significant role in regularizing working hours, working conditions, and reducing the accident and dangerous occurrences in the factories, redressal of the grievances of the workers in respect of Safety Health and Welfare through a set of policies and programs developed by both the Central and State Government. Some of the functions of DISH are</p> <ul style="list-style-type: none"> Eliminating inequality and discrimination in the workplace Enhancing occupational health and safety awareness and compliance in the workplace Workforce and community participation, to employers, employees, workplaces, communities, businesses, and unions; and Providing policy advice and analysis to government on labour and employment related matters. <p>The main activities Directorate Industrial Safety and Health Department are:</p> <ul style="list-style-type: none"> To create awareness for Health & Safety amongst workers and factory management through seminars and other programs. To update with the latest trend department, arrange the Safety Conference every year. To encourage and appreciate the workers contribution in the industry by Prime Minister's Shram Awards To facilitate implementation of various welfares schemes for Construction workers. To conduct required Health & Hygiene Survey in various industrial sectors.
15	State Forest Department	<p>The Andhra Pradesh Forest Department came into existence on 1st Nov. 1956 with the formation of a separate state Andhra Pradesh. There are 5 territorial circles (Anantapuram, Guntur, Kurnool, Rajahmundry, Visakhapatnam, & Tirupati), 1 wildlife circle and 1 Project Tiger circle in the State. As per the Article 48A of the Constitution of India, the department is protecting and improving the environment and safeguarding the forests and wildlife of the State.</p>

3.2 Andhra Pradesh Renewable Energy Export Policy, 2020

Andhra Pradesh Government in order to encourage, develop and promote renewable energy projects in Andhra Pradesh had notified "Andhra Pradesh Renewable Energy Export Policy 2020". The objective of the policy would be.

- To facilitate 120 GW renewable energy projects.
- To facilitate lease of 5 lakh acres of potential land in the state of Andhra Pradesh to renewable energy export project developers.
- To attract private investments to the State and improve local economy.
- To promote setting up of renewable energy equipment manufacturing facilities in the State.
- To generate additional revenue to the State Government.

The policy facilitates the developer in land facilitation by appointing NREDCAP as a land aggregating agency. NREDCAP will procure and aggregate government and private lands at potential locations for allotment to the project developers on lease basis. Land lease facilitation will be done by Nodal Agency to the permitted developers against payment of prescribed charges with lease period of 30 years. Under this policy the government encourages the private developers to install connecting transmission line or using the existing / new evacuation line developed by APTRANSCO, by bearing the entire cost for laying those lines.

Followed by the Policy being notified by the Government, NREDCAP had submitted proposal for revision in the policy. As per the amendment issued by the Government dated 13-09-2022, the compensation issued to the landowners was revised from INR. 25,000 to INR. 30,000 with 5% escalation every two years. Under this amendment, the remittance charges which to be deposited in the consolidated fund of the state has been revised from INR. 6000 to INR. 1000 with 5% escalation for every two years.

3.3 Applicable National Environmental and Social Acts and Rules

Table 3-2 below summarizes the key regulations that are relevant to the project across its lifecycle. This table should be used to update/develop a comprehensive legal register for the project that can be regularly monitored for compliance as well as updated to reflect changes/non-applicability of regulations, policies, and standards.

Table 3-2 Applicability of key E&S regulations in the different phases of Project Lifecycle

Sr. No.	Applicable Regulation/Permit	Pre-Construction	Construction	Operation	Responsible Authority	Applicability to the Project/ Status
Environment Protection						
•	Environmental Clearance under EIA Notification 2006 and Environment Protection Act, 1986	x	x	x	MoEFCC	As per the EIA Notification (2006) and its amendments, the Solar Power project does not require prior environmental clearance (EC) from the Ministry of Environment Forest and Climate Change (MoEFCC) or the State Environmental Impact Assessment Authority (SEIAA).
•	Consent to Establish (CTE) and Consent to Operate (CTO) under the Air (Prevention and Control of Pollution) Act, 1981. The Water (Prevention and Control of Pollution) Act 1974	x	✓	x	APPCB CPCB	As per latest notification from the Central Pollution Control Board (CPCB), dated 07/03/2016 [Ref No: B-29012/ ESS (CPA)/2015-2016], and dated 18/01/2017 [Ref No: B-29012/ESS(CPA)/2016-17] "Solar power generation through solar photovoltaic cell, wind power and mini hydel power (less than 25 MW)" has been classified to "white category" from "green category" and therefore "there shall be no necessity in obtaining 'Consent to Establish and Operate' for white category of industries except for an intimation to the concerned SPCB (State Pollution Control Board) and Pollution Control Committee (PCC) office. However, it is confirmed that there is no batching plant planned on site for project. Therefore the project will not be required to obtain CTE and CTO during construction phase for operation of batching plant at site.
•	Hazardous Waste Authorization under Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 as amended till date	x	✓	✓	APPCB CPCB	According to Hazardous and Other Wastes (Management and Transboundary Movement) Amendment Rules, 2019, an occupier shall not be required to obtain Hazardous Waste Authorization from SPCB in case Consent to Establish (CTE) or Consent to Operate (CTO) is not required under The Air (Prevention and Control of Pollution) Act, 1981 and The Water (Prevention and Control of Pollution) Act, 1974. Provided that the hazardous and other wastes generated by the occupier shall be given to the actual user, waste collector or operator of the disposal facility in accordance with CPCB guidelines. Since the Project does not require CTE and CTO, hence Project is exempted from obtaining hazardous waste authorization. However, the project will store and dispose hazardous wastes such as used oil from DG sets and transformers, contaminated cotton rags, empty drums of paint container to APPCB authorised hazardous waste recycler. Project SPV is yet to identify an authorised recycler for disposal of hazardous waste from site. The maintenance of waste records indicated in the Hazardous and Other Wastes Rules, 2016 also needs to be complied.
•	Environment Protection Act, 1986 and as amended till date	✓	✓	✓	MoEFCC CPCB APPCB	Permissible limits for ambient air quality, water quality, noise limits have been laid down by CPCB under EP Act, 1986 which requires to be complied with
•	The Noise (Regulation & Control) Rules, 2000 and as amended up to 2010 Ambient Noise Standards	x	✓	✓	APPCB CPCB	As per the Act, ambient noise levels are to be maintained as stipulated in the rules for different categories of areas such as residential, commercial, and industrial and silence zones. Considering the context of the Project, project SPVs and their contractors will need to abide by the limits prescribed for residential zones.
•	Solid Waste Management Rules 2016 as amended	x	✓	✓	APPCB/ local municipal body	All bio-degradable, non-biodegradable and domestic hazardous wastes generated from the project will be managed by Project SPVs (the waste generator) in accordance with the relevant provision of this Rule.
•	Construction and Demolition Waste Management Rules 2016	x	✓	✓	Local authority	Construction waste generated at site will be handled as per the provisions of Construction and Demolition Waste Management Rules, 2016.
•	Manufacture, Storage, and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and as amended	x	✓	✓	APPCB	Rules will be applicable during construction and operation phases if chemicals stored at site satisfy the criteria laid down in the Rules
•	Battery Waste Management Rules, 2022	x	✓	✓	APPCB	Rules will be applicable during construction and operation phases as the project will use Batteries for power back up.
•	E-waste (Management) Rules 2022	x	✓	✓	APPCB	Rules will be applicable if electrical and electronics as listed in the Schedule I of the mentioned rules will be used and will require replacement within the lifecycle of the project
•	Bio-Medical Waste Management Rules, 2016	x	✓	✓	APPCB	Bio-medical waste generated at site will attract provisions of Bio-Medical Waste Management Rules, 2016. Biomedical waste generated to be disposed of through authorised agency.

•	Ground water extraction permission will be required if the project plans to abstract groundwater for fulfilling water demand.	✓	✓	✓	Andhra Pradesh Ground Water Department	<p>As per the information provided by CGWB in the Dynamic Groundwater Resources of India (2023), the proposed Project fall in an area categorised as <u>Safe</u> in terms of groundwater development.</p> <p>In Andhra Pradesh, the provision of No Objection Certificates (NOCs) for groundwater abstraction is governed by both the Central Ground Water Authority (CGWA) and the Andhra Pradesh Ground Water Department. The specific authority responsible for issuing the NOC depends on the nature of the project and the location.</p> <p>As per CGWA notification dated 24 September 2020, in Safe assessment units, No Objection Certificate shall be granted for ground water abstraction to any new industry except those falling in the category of Micro, Small and Medium Enterprises (MSME). Since the project is in Safe zone, groundwater abstraction shall be permitted for the project development</p> <p>NOC for abstraction of water shall be granted by CGWB and the Project shall be required to adhere to the conditions stipulated in the NOC.</p>
•	Petroleum and Explosives Safety Organisation (PESO) License under Petroleum Act, 1934 and Petroleum Rules, 2002 and as amended	×	✓	×	PESO	<p>PESO license will be applicable to the project, in case project plans to store or transport petroleum Class B product greater than 2500 litres in non-bulk (i.e. drums) or 1000 litres in a receptacle / tank (i.e. bulk) within project premises.</p>
Labour						
•	Contract Labour (Regulation & Abolition) Central Act 1970 and Contract Labour (Regulation and Abolition) Rules, 2015 Andhra Pradesh	×	✓	✓	Labour Department	<p>The Act applies to:</p> <ul style="list-style-type: none"> To every establishment in which fifty or more workers are employed or were employed on any day of the preceding twelve months as contract labour To every contractor who employees or who employed on any day of the preceding twelve months fifty or more workers <p>The Act details out conditions of licensing of contractors¹⁴ and ensure basic welfare measures to be made available to the contract workers by the employer, which includes:</p> <ul style="list-style-type: none"> Canteens Restrooms First aid facilities Liability of principal employer Responsibility for payment of wages Penalties and procedure Registers and other records to be maintained¹⁵
•	Minimum Wages Act 1948	×	✓	✓	Labour Department	<p>The act ensures minimum wages for each category of workers. Per the provision of the Act, the employer shall pay to every employee engaged in a schedule employment under them, wages at a rate not less than the minimum wages fixed by such notification of by the state government for that class of employees in that employment without any deductions except as may be authorised within such time and subject to such conditions as may be prescribed.</p> <p>Further, the Act also detailed out provisions on key aspects, such as:</p> <ul style="list-style-type: none"> fix the working hours for a normal working day overtime payment wages of worker who works for less than normal working days Minimum time rate wages for piecework Maintenance of registers and records Penalties on offences to the Act General provision for punishment of offences Payment of undisbursed amounts due to employees <p>Overtime Payment</p> <p>The employer shall pay to every employee engaged in a scheduled employment under him wages at a rate not less than the minimum rate of wages fixed by the appropriate Government Authority for that class of employees in that employment without any deductions except as may be authorized within such time and subject to such conditions as may be prescribed</p>
•	Equal Remuneration Act 1976	×	✓	✓	Labour Department	<p>Puts in place rules and regulations governing the remuneration payable to workers and employees</p>
•	The Payment of Wages Act, 1936, amended in 2005 and 2017	×	✓	✓	Labour Department	<ul style="list-style-type: none"> This Act was passed with the aim of regulating the payment of wages but excluding bonus/pension/PF/gratuity etc. to persons employed in any factory, either directly or indirectly through a sub-contractor. The Act holds the employer solely responsible for the payment of wages to the employees. The Act also specifies the need for a timeline for the wage payment, and the provisions for fines and deductions amongst other details pertaining to wages No wage period shall exceed one month
•	Maternity Benefit Act, 1961 & The Maternity Benefit (Amendment) Act, 2017	×	✓	✓	Labour Department	<ul style="list-style-type: none"> Every woman shall be entitled to, and her employer shall be liable for, the payment of maternity benefit at the rate of the average daily wage for the period of her actual absence the period immediately preceding the day of her delivery, the actual day of her delivery and any period immediately following that day. Increases the duration of the maternity leave from 12 to 26 weeks which can be availed prior to 8 weeks from the date of expected delivery (earlier it was 6 weeks prior). From third child onwards, maternity leave to be for 12 weeks which can be availed 6 weeks prior. Employer to permit a woman to work from home, if the nature of work permits her to do so and the same can be availed after the completion of her maternity leave for a duration mutually decided. Woman to be informed at the time of appointment, of the maternity benefits available, either in writing or electronically.

¹⁴ No contractor to whom this Act applies, shall undertake or execute any work through contract labour except under and in accordance with a license issued in that behalf by the licensing officer

¹⁵ Every principal employer and every contractor shall maintain such registers and records giving such particulars of contract labour employed, the nature of work performed by the contract labour, the rates of wages paid to the contract labour and such other particulars in such form as may be prescribed.

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• The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013	x	✓	✓	Labour Department	<ul style="list-style-type: none"> No woman shall be subjected to sexual harassment at any workplace The following circumstances, among other circumstances, if it occurs or is present in relation to or connected with any act or behaviour of sexual harassment may amount to sexual harassment: - <ul style="list-style-type: none"> Implied or explicit promise of preferential treatment in her employment: or Implied or explicit threat of detrimental treatment in her employment; or Implied or explicit threat about her present or future employment status: or Interference with her work or creating an intimidating or offensive or hostile work environment for her; or Humiliating treatment likely to affect her health or safety.
• The E.P.F. and Miscellaneous Provisions act, 1952	x	✓	✓	Labour Department	<ul style="list-style-type: none"> This Act is applicable to every factory or establishment employing 20 or more persons. This Act requires the employer to provide for provident fund as under the scheme to the general public The contribution which shall be paid by the employer to the Fund shall be ten percent. Of the basic wages, dearness allowance and retaining allowance, if any, for the time being payable to each of the employees whether employed by him directly or by or through a contractor, and the employee's contribution shall be equal to the contribution payable by the employer in respect of him and may, if any employee so desires, be an amount exceeding ten percent of his basic wages, dearness allowance and retaining allowance if any,
• Payment of Bonus Act, 1965 and rules and subsequent amendment	x	✓	✓	Labour Department	<p>Every employee shall be entitled to be paid by his employer in an accounting year, bonus, in accordance with the provisions of this Act, provided he has worked in the establishment for not less than thirty working days in that year. Further, every employer shall be bound to pay to every employee in respect of the accounting year commencing on any day in the year 1979 and in respect of every subsequent accounting year, a minimum bonus which shall be 8.33 per cent. Of the salary or wage earned by the employee during the accounting year or one hundred rupees, whichever is higher, whether or not the employer has any allocable surplus in the accounting year.</p> <p>An employee shall be disqualified from receiving bonus under this Act, if he is dismissed from service for</p> <ul style="list-style-type: none"> fraud; or riotous or violent behaviour while on the premises of the establishment; or theft, misappropriation, or sabotage of any property of the establishment
• Payment of Gratuity Act, 1972	x	✓	✓	Labour Department	<p>Gratuity shall be payable to an employee on the termination of his employment after he has rendered continuous service for not less than five years,</p> <ul style="list-style-type: none"> on employee's superannuation, or on his retirement or resignation, on his death or disablement due to accident or disease <p>Provided that the completion of continuous service of five years shall not be necessary where the termination of the employment of any employee is due to death or disablement.</p> <p>The gratuity amount will be calculated as follows:</p> <ul style="list-style-type: none"> Employees are entitled to get the salary of 15 days for every completed year as gratuity. Only the basic pay and DA (if any) are considered while accounting for the salary. It means any bonus, special allowance and HRA are not taken for the gratuity calculation. <p>Note</p> <p>Gratuity calculation:</p> <p>Gratuity = (Salary / 26) x 15 x Number of years in service</p> <p>Where:</p> <p>Salary is "Last drawn basic pay + DA"</p> <p>26 is the average working days in a month (As per Gratuity rules – 26 days not 30 days calculated)</p> <p>15 is the actual days considered for gratuity in a year</p>
• ESI Act, 1948 (Employees State Insurance Act, 1948)	x	✓	✓	Labour Department	<ul style="list-style-type: none"> It applies to all non-seasonal factories To provide benefits in case of sickness, maternity, and employment injury' and to make provision for certain other matters in relation thereto. all employees in factories or establishments to which this Act applies shall be insured in the manner provided by this Act. The contribution payable under this Act in respect of an employee shall comprise contribution payable by the employer (hereinafter referred to as the employer's contribution) and contribution payable by the employee (hereinafter referred to as the employee's contribution) and shall be paid to the Corporation.
• Workmen's Compensation Act, 1923	x	✓	✓	Labour Department	<ul style="list-style-type: none"> Payment of compensation amount as applicable at the time of the accident resulting in a temporary or a permanent disablement such that it reduces the earning potential of workman in any employment. Or contracts an occupational disease peculiar to that employment
• Child Labour (Prohibition and Regulation) Act, 1986 and subsequent amendments	x	✓	✓	Labour Department	<p>The Act intends to:</p> <ul style="list-style-type: none"> Ban the employment of children, i.e., those who have not completed their fourteenth year, in specified occupations and processes Lay down a procedure to decide modifications to the schedule of banned occupations or processes Regulate the conditions of work of children in employments where they are not prohibited from working Lay down enhanced penalties for employment of children in violation of the provisions of this Act and other Acts which forbid the employment of children
• The Bonded Labour System (Abolition) Act 1976;	x	✓	✓	Labour Department	<p>Abolition of Bonded Labour System: (i) The bonded labour system is abolished, and every bonded labourer stands free and is discharged from any obligation to render any bonded labour; (ii) (a) No person is to make any advance of bonded labour, (b) No person is to compel any person to render any bonded labour or other form of forced labour.</p>

•	The Protection of Civil Rights Act, 1955	x	✓	✓	Labour Department	A person shall be deemed to boycott another person who – (a) refuses to let to such other person or refuses to permit such other person, to use or occupy any house or land or refuses to deal with, work for hire for, or do business with, such other person or to render to him or receive from him any customary service, or refuses to do any of the said things on the terms on which such things would be commonly done in the ordinary course of business; or (b) abstains from such social, professional or business relations as he would ordinarily maintain with such other person.
•	Inter-state Migrant Workmen Act 1979.	x	✓	✓	Labour Department	<p>The Key provisions of the Act, include:</p> <ul style="list-style-type: none"> Responsibility of payment of wages: 1) A contractor shall be responsible for payment of wages to each inter-state migrant workman employed by him and such wages shall be paid before expiry of such period as may be prescribed; 2) Every principal employer shall nominate a representative duly authorised by him to be present at the time of disbursement of wages by the contractor and it shall be the duty of such representative to certify the amounts paid as wages in such manner and may be prescribed; 3) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the authorize representative of the principal employer; 4) In case the contractor fails to make payment within the prescribed period or make short payment, then the principal employer shall be liable to make payment of the wages in full or the unpaid balance due, as the case maybe, to the inter-State migrant workman employed by the contractor and recover the amount so paid from the contractor either by deduction from any amount payable to the contractor under any contract or as a debt payable by the contractor The wage rate of an interstate migrant worker shall in no case be paid less than the wages fixed under the Minimum Wages Act, 1948, 2. Wages payable to an interstate migrant workman shall be paid in cash There shall be paid by the contractor to every interstate migrant worker at the time of recruitment, a displacement allowance equal to fifty per cent of the monthly wages payable to him or seventy-five rupees whichever is higher <p>The amount paid to a worker as displacement allowance shall not be refundable and shall be in addition to the wages or other amount payable to him</p>
•	The Building and other Construction Workers Act, 1996	x	✓	✓	Labour Department	A person shall be deemed to boycott another person who – (a) refuses to let to such other person or refuses to permit such other person, to use or occupy any house or land or refuses to deal with, work for hire for, or do business with, such other person or to render to him or receive from him any customary service, or refuses to do any of the said things on the terms on which such things would be commonly done in the ordinary course of business; or (b) abstains from such social, professional or business relations as he would ordinarily maintain with such other person.
•	The Industries Disputes (Amendment) Act, 2010	x	✓	✓	Labour Department	<p>The Key provisions of the Act, include:</p> <ul style="list-style-type: none"> Responsibility of payment of wages: 1) A contractor shall be responsible for payment of wages to each inter-state migrant workman employed by him and such wages shall be paid before expiry of such period as may be prescribed; 2) Every principal employer shall nominate a representative duly authorised by him to be present at the time of disbursement of wages by the contractor and it shall be the duty of such representative to certify the amounts paid as wages in such manner and may be prescribed; 3) It shall be the duty of the contractor to ensure the disbursement of wages in the presence of the authorize representative of the principal employer; 4) In case the contractor fails to make payment within the prescribed period or make short payment, then the principal employer shall be liable to make payment of the wages in full or the unpaid balance due, as the case maybe, to the inter-State migrant workman employed by the contractor and recover the amount so paid from the contractor either by deduction from any amount payable to the contractor under any contract or as a debt payable by the contractor The wage rate of an interstate migrant worker shall in no case be paid less than the wages fixed under the Minimum Wages Act, 1948, 2. Wages payable to an interstate migrant workman shall be paid in cash There shall be paid by the contractor to every interstate migrant worker at the time of recruitment, a displacement allowance equal to fifty per cent of the monthly wages payable to him or seventy-five rupees whichever is higher <p>The amount paid to a worker as displacement allowance shall not be refundable and shall be in addition to the wages or other amount payable to him</p>
•	Trade Union Act, 1926	x	✓	✓	Labour Department	<p>Any seven or more members of a Trade Union may, by subscribing their names to the rules of the Trade Union and by otherwise complying with the provisions of this Act with respect to registration, apply for registration of the Trade Union under this Act.</p> <p>The admission of ordinary members who shall be persons actually engaged or employed in an industry with which the Trade Union is connected, and the admission of the number of honorary or temporary members to form the executive of the Trade Union</p>
•	Persons with Disabilities Act, 1995 and Persons with Disability Rules 1996	x	✓	✓	Labour Department	<ul style="list-style-type: none"> Give effect to the proclamation on the full participation and equality (equal opportunities) of people with disabilities and protection of rights The employer in every establishment shall furnish such information or return as may be prescribed in relation to vacancies appointed for person, with disability that have occurred or are about to occur in that establishment to such Special Employment Exchange as may be prescribed and the establishment shall thereupon comply with such requisition. Every employer shall maintain such record in relation to the person. With disability employed in his establishment in such form and in such manner as may be prescribed by the appropriate Government Every appropriate Government shall appoint in every establishment such percentage of vacancies not less than three per cent. For persons or class of persons with disability of which one per cent. Each shall be reserved for persons suffering from- <ul style="list-style-type: none"> Blindness or low vision Bearing impairment Loco motor disability or cerebral palsy, in the posts identified for each disability: <p>Provided that the appropriate Government may, having regard to the type of work carried on in any department or establishment, by notification subject to such conditions, if any, as may be specified in such notification, exempt any establishment from the provisions of this section.</p>
•	Ancient Monuments and Archaeological Sites and Remains Act 1958	x	✓	x	Labour Department	<p>This Act places restrictions on the destruction, alteration, defacement, or removal of monuments and on construction on or near the site of any protected monument.</p> <p>No person, including the owner or occupier of a protected area, shall construct any building within the protected area or carry on any mining, quarrying, excavating, blasting or any operation of a like nature in such area, or utilise such area or any part thereof in any other manner without the permission of the Central Government</p>

Note:

The Government of India has introduced four (4) new labour codes¹⁶, which were passed by Parliament between 2019 and 2020. However, these codes have not yet been implemented. Based on a review of secondary information, it is anticipated that these codes may be implemented in the year 2025. Nevertheless, the Project SPV should proactively prepare for the forthcoming implementation of the new labour codes and ensure that its relevant policies and legal registers are updated accordingly.

¹⁶ The four labour codes are:

- The Code on Wages, 2019:** This code replaces four (4) laws related to wages, minimum wages, payment of wages and bonus. It ensures the right to minimum wages and timely payment of wages for all workers, regardless of the sector or industry. It also introduces a statutory floor wage, a national minimum wage, and a mechanism for regular revision of wages.
- The Code on Social Security, 2020:** This code replaces nine laws related to social security, provident fund, pension, maternity benefit, gratuity, insurance, and unorganised workers. It extends social security coverage to all workers, including those in the informal sector, gig economy and platform workers. It also provides for the establishment of a National Social Security Board, a Social Security Fund, and a National Database for Unorganised Workers

Ecology

•	Wildlife (Protection) Act, 1972	✓	✓	✓	Wildlife Warden, If any protected/ endangered flora or fauna (as listed in Schedules of Wildlife Protection Act, 1972) are found in the study area, the proponent should implement conservation measures for their protection. State Forest Department
•	The Forest Conservation Act, 1980	✓	×	×	Divisional Forest NOC from the Forest Department will be required before construction to remove the green tree present within the project boundary. Officer, State Forest Department

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- **The Occupational Safety, Health, and Working Conditions Code, 2020:** This code replaces 13 laws related to occupational safety, health and working conditions of workers. It applies to all establishments employing 10 or more workers, except mines and docks. It provides for the issuance of a single licence, registration, and annual return for multiple activities. It also lays down the duties and rights of employers and employees, the standards for working hours, leave, welfare facilities, health and safety measures and grievance redressal mechanisms
- **The Industrial Relations Code, 2020:** This code replaces three laws related to trade unions, industrial disputes and collective bargaining. It applies to all industrial establishments employing 20 or more workers, except those engaged in charitable, educational or research activities. It provides for the recognition of trade unions, the formation of a two-tier system of industrial tribunals, the regulation of strikes and lockouts, the prevention of unfair labour practices and the promotion of fixed term employment

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3.4 Environmental and Social Framework 2024

The Asian Infrastructure Investment Bank (AIIB) has developed an Environmental and Social Framework (ESF) to ensure that its investments support sustainable development. The overarching objective of this policy is to facilitate achievement by the Bank's Clients of these development outcomes, through a system that integrates sound environmental and social management into Projects.

Environmental and Social Policy (ESP) outlines the institution's commitment to ensuring that its projects promote environmentally sustainable and socially inclusive development. The policy sets forth mandatory environmental and social requirements applicable to all Projects. 2024 ESF includes revised Environmental and Social Standards (ESS) that reflect the latest global best practices in managing risks and impacts.

Environmental and Social Standards (ESS) provide more detailed requirements for project implementation. These standards are designed to help borrowers and clients meet the ESP's objectives. The following three associated environmental and social standards (ESSs), which set out more detailed mandatory environmental and social requirements to be implemented by the Client, depending on the nature of the Project. These standards cover the following:

- **ESS 1 Environmental and Social Assessment and Management:** ESS1 applies to the project if the bank determines based on consultation with the client, that the Project is likely to have adverse environmental and/or social risks and impacts, it requires the Client to conduct an environmental and social assessment relating to these risks and impacts, and design appropriate measures to avoid, minimize, mitigate, offset or compensate for them, all as required under ESS 1. The 2024 updates to ESS 1 reflect AIIB's dedication to aligning with global best practices and addressing the growing challenges of climate change, biodiversity loss, and social inequality.
- **ESS 2 Land Acquisition and Involuntary Resettlement:** ESS2 applies to the projects likely to involve Involuntary Resettlement and bank recommends addressing these aspects in the social section of the assessment report. The objectives of this ESS 2 are: (a) to avoid Involuntary Resettlement wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance of Involuntary Resettlement is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-Project levels and to provide resettlement assistance; (d) to understand and address gender-related risks and differential impacts of Involuntary Resettlement; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the Project to share in Project benefits.
- **ESS 3 Indigenous Peoples:** ESS 3 applies if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The objective of the ESS 3 is to design and implement Projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, economies and cultures, as defined by the Indigenous Peoples themselves, so that they: (a) receive culturally appropriate social and economic benefits; (b) do not suffer adverse impacts as a result of Projects; and (c) can participate actively in Projects that affect them.

Disclosure of Environmental and Social Information: AIIB emphasizes transparency and accountability through the disclosure of environmental and social information related to its projects. Disclosure may be timely, accessible, gender sensitive and inclusive and culturally appropriate manner and location, and in a form and language(s) understandable to the Project-affected people, other relevant stakeholders who may have specific needs. The objective is to provide these stakeholders with an opportunity to broadly identify and address the Project's environmental and social risks and impacts, including those involving Involuntary Resettlement, Indigenous Peoples and community health and safety aspects, so they can provide meaningful inputs into the design and implementation of the Project.

Some of the other key policies of Asian Infrastructure Investment Bank (AIIB) and a brief overview of each is presented below:

- **Gender Action Plan (GAP):** This plan is designed to ensure that gender considerations are integrated into AIIB projects. It aims to promote gender equality and women's empowerment by addressing specific needs and impacts on different genders in project planning and implementation.

- **Policy on Public Information:** This policy governs how AIIB shares information with the public. It typically outlines the bank's commitment to transparency and the procedures for accessing project information, ensuring that stakeholders and the general public can stay informed about the bank's activities.
- **Policy on the Project-Affected People's Mechanism (PPM):** This policy provides a framework for addressing grievances and concerns from communities or individuals who are affected by AIIB-funded projects. It establishes a mechanism through which these stakeholders can raise issues and seek redress, ensuring that their voices are heard and their concerns are addressed.

3.5 New Development Bank Environment and Social Framework

The aim of this Environment and Social Framework is to: manage environmental and social risks and impacts in projects; manage operational and reputational risks of NDB and its stakeholders; mainstream environmental and social considerations into decision-making processes of all parties; and encourage the international good environmental and social practices in its operations and in doing so strengthen the country systems. The policy also seeks to ensure environmental and social soundness and sustainability of projects, enable clients to identify and manage environmental and social risks and impacts in NDB's projects, improve development effectiveness and impact to increase results on the ground, and facilitate cooperation on environmental and social matters with development partners.

The core principles and the intent which form the basis of the Framework, standards and procedures as well as the associated guidelines are delineated as follows:

- Inclusive and sustainable development:** This principle focusses on to ensure inclusive sharing of development benefits and opportunities including among the traditionally deprived sections such as the poor, disadvantaged, women, children and minorities. The process of inclusion entails both access to and delivery of services. NDB recognizes the importance of maintaining policy and operating standards which (i) promote sustainable development; (ii) are aligned with international good practices; and (iii) effectively respond to environmental and social risks;
- Country systems:** NDB promotes the use of strong country and corporate systems in the management of environment and social risks and impacts. NDB also assists in further strengthening the country systems through a variety of mechanisms in both the public and private sector, including by (i) favoring use of country systems, with adequate support, at the operational level as it also fosters greater accountability and ownership; (ii) coordinating closely with other multilateral development banks, international financial institutions and relevant centers of expertise; and (iii) maintaining a risk based and outcome focused approach through measures aligned with the core principles;
- Environment and social interests:** NDB integrates the principles of environment and social sustainability into its policies and operations, as an integral part of its decision-making process, to ensure its financing and investment in infrastructure and sustainable development projects have minimal adverse impact on environment and people;
- Climate change:** NDB seeks to promote mitigation and adaptation measures to address climate change. Recognizing the sustainable nature of green economic growth and the associated benefits, NDB aims to build upon existing green economic growth initiatives and provide support for the new ones at regional, national, sub-national and private sector level. NDB also encourages climate proofing of its infrastructure financing and investments to build resilience to climate change.
- Conservation of natural resources:** NDB promotes the conservation of natural resources including energy, water and supports sustainable land use management and urban development.
- Gender equality:** NDB believes that gender equality is important to successful and sustainable economic development and accordingly considers it imperative to mainstream gender equality issues in all its operations;
- Precautionary approach:** NDB uses a precautionary approach to justify discretionary decisions in situations where there is the possibility of environmental and social harm from making project decisions; and
- Co-operative functioning and knowledge dissemination:** NDB seeks to complement the existing efforts of multilateral financial institutions, regional financial institutions and other agencies. In co-financed projects, NDB seeks to promote harmonization of its policies with partnering financial institutions and other agencies by way of adopting a common approach to appraisal, environmental and social management requirements, monitoring and reporting. In addition, NDB intends to disseminate knowledge gained with its development partners.

3.6 World Bank Group EHS Guidelines

3.6.1 General Environment, Health & Safety (EHS) Guidelines, 2007

The World Bank Group General Environment, Health and Safety (EHS) Guidelines are a set of technical reference documents that provide guidance on how to manage environmental, health and safety issues in various sectors and projects. The General EHS

Guidelines cover topics such as air emissions, energy conservation, wastewater, water conservation, hazardous materials management, waste management, noise and contaminated land. They also provide performance levels and measures that are considered to be achievable by existing technology at reasonable costs. The General EHS Guidelines are designed to be used together with the Industry Sector EHS Guidelines, which provide specific guidance for different types of industries, such as mining, oil and gas, power generation, construction, etc.

3.6.2 Guidelines for electric power transmission and distribution, 2007

The World Bank's Guidelines for Electric Power Transmission and Distribution (2007) are a set of technical reference documents that provide guidance on how to manage environmental, health and safety issues in various sectors and projects related to electric power transmission and distribution. They are part of the World Bank Group's Environmental, Health and Safety Guidelines, which are applied when the World Bank Group is involved in a project, as required by its policies and standards. The Guidelines cover topics such as air emissions, energy conservation, wastewater, water conservation, hazardous materials management, waste management, noise and contaminated land.

3.7 IFC and European Bank for Reconstruction and Development (EBRD) Guidance Note on Workers' Accommodations: Processes and Standards, 2009

The International Finance Corporation (IFC) and the European Bank for Reconstruction and Development (EBRD) Guidance Note on Workers' Accommodation: Processes and Standards is a document that provides practical guidance to IFC and EBRD specialists, consultants, and clients on how to plan, design, construct, operate and manage workers' accommodation facilities in relation to projects funded by IFC or EBRD. The document covers the following topics:

- The rationale and objectives of providing workers' accommodation.
- The types of workers' accommodation that may be required by various projects, such as temporary exploration camps, construction camps and permanent dormitories.
- The processes and standards that should be applied to the provision of workers' accommodation, including environmental and social impact assessment, site selection, design and construction, operation, and management, decommissioning and closure.
- The international standards and guidance on food safety, water sanitation, waste management, fire safety, building regulations, health care, security, human rights, and labour rights that should be followed by IFC and EBRD clients

The document also provides a checklist of key issues to consider when planning and implementing workers' accommodation projects. The document is intended to be used together with the IFC Performance Standards on Environmental and Social Sustainability and the EBRD Performance Requirements on Environmental and Social Policy.

3.8 International Covenant on Biodiversity, Economic, Cultural and Social Rights and relevant ILO Core Labour Standards Conventions

India ratified the International Covenant on Economic, Social and Cultural Rights (ICESCR) on 10 April 1979¹⁸. The ICESCR is a treaty that recognizes the rights of all people to enjoy a range of economic, social and cultural rights, such as the right to work, the right to education, the right to health, and the right to an adequate standard of living. The ICESCR also obliges its states parties to take steps, individually and through international cooperation, to progressively realize these rights by all appropriate means. India is also a party to the eight core labour standards conventions of the International Labour Organization (ILO), which are considered essential for the promotion of social justice and human dignity in the world of work. The ILO core labour standards focus on specific aspects of labour rights and labour standards that are essential for decent work, such as freedom of association, elimination of forced labour, abolition of child labour, and elimination of discrimination. The ICESCR and the ILO core labour standards are complementary and mutually reinforcing instruments that aim to protect and promote the human rights of workers and other people. As a state party, India is obliged to respect, protect and fulfill its obligations under these instruments, and to report periodically on its progress to the relevant treaty bodies.

Since gaining independence, India has actively participated in significant international events related to environmental and biodiversity conservation. The country has made substantial contributions to shaping agreed-upon texts and has ratified and complied with commitments outlined in various international conventions pertaining to biodiversity. Some of the key conventions ratified by India include:

¹⁸ - [OHCHR Dashboard](#) (Accessed on September 14, 2023)

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- I. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- II. Convention on the Conservation of Migratory Species of Wild Animals (CMS)
- III. Convention on Wetlands of International Importance (Ramsar Convention)
- IV. The Wildlife Trade Monitoring Network (TRAFFIC)
- V. World Natural Heritage Convention (WNHC)
- VI. Convention on Biological Diversity (CBD)

As a state party to these conventions, India is obligated to uphold, safeguard, and fulfill the responsibilities outlined in the final draft of these agreements. Additionally, India is required to provide periodic reports on its progress and actions taken to the relevant treaty bodies, demonstrating its commitment to international biodiversity conservation efforts.

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3.9 Applicability of AIIB ESS

The applicability of AIIB safeguards to the Project has been summarized in **Table 3-3**.

Table 3-3 Applicability of AIIB ESS to the Project

Sr. No.	AIIB ESS	Applicability/ Compliance
1.	Environmental and Social Standard 1: Environmental and Social Assessment and Management	Applicable An Initial Environmental & Social Examination (ESIA) for the project has been undertaken to identify and assess any potentially adverse environmental and social impacts associated with the proposed Project, assess compliance with applicable laws and the applicable reference framework, determine the measures needed to prevent or minimize and mitigate the adverse impacts, and identify potential environmental and social opportunities, including those that would improve the environmental and social sustainability of the Project.
2.	Environmental and Social Standard 2: Land Acquisition and Involuntary Resettlement	Applicable Based on the consultation with SAEL, it is understood that about 1881.32 acres of Dry Agriculture private land from Koduru Village have been identified, out of which ~1500 acres from 350 landowners will be procured for the proposed project. The land is proposed to be sourced by executing long term lease agreement on Willing Lessor and Willing Lessee basis. As on 30th August 2024, Agreement to Lease (ATL) was signed for about 164.315 acres of land and Lease agreement was signed for 1041.67 Acres . Based on the findings made during the site visit and consultation with the landowners establishes the land identified for the project does not hold any physical residential structures and the land was classified as Dry Agriculture land. Agriculture is rainfed and not being extensively cultivated due to scarcity of the irrigation facilities. It was also confirmed by the SAEL land team that. <ul style="list-style-type: none"> • Land procurement for the plant site is only covered for only 64% and the rest land parcels will be procured by end of September 2024. Details on the impact of the project on the livelihood of the formal and informal land users can only be assessed once the procurement process for the entire project site is over. • The solar plant site does not source land by way of expropriation or other compulsory procedures in accordance with the legal system of India. • The land required for the project are being source through negotiation with the farmers and the compensation to be paid is in accordance with the AP Renewable Energy Export Policy 2020 and its amendments. • There are no communal property and natural resources such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and grazing and cropping areas within the project site. • The project will not deviate the natural streams / irrigation canals which serves as source of irrigation and livelihood for the neighboring farmers. • There has been no implementation of site-specific Stakeholder Engagement Plan and Grievance Redressal Mechanism for engagement or redressal of grievances for the local community members. Regarding transmission line, the safeguard applies due to the following reasons: <ul style="list-style-type: none"> • As the construction of transmission line (especially tower) will obstruct the usage of the resource (agricultural land) to the Project Impacted Households (PAHs) and will also result in loss of standing crops. The impact duration will be for short period of time and may remain for six (6) months (the one agriculture season takes 3 to 4 months). • The stringing of transmission line will not result in obstruction of resource (agriculture land). However, the stringing will result in loss of standing crops.

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Sr. No.	AIIB ESS	Applicability/ Compliance
		<ul style="list-style-type: none"> • The upcoming project would lead to adverse impact on these informal users as there will be reduction of available area for agriculture, thus leading to economic and financial impact on household. • Possibility on loss of any physical structures, which can only be determined after the transmission line route alignment is finalized. • The upcoming project would lead to adverse impact on these informal users as there will be reduction of available area for agriculture, thus leading to economic and financial impact on household. • Possibility on loss of any physical structures, which can only be determined after the transmission line route alignment is finalized.
3.	Environmental and Social Standard 3: Indigenous Peoples	Not Applicable The proposed solar site land including the tentative TL route does not fall under Schedule-V areas as defined in the Indian Constitution under Article 244(1). Based on the information shared by the SAEL team, site findings and review of secondary data reveals that the land being involved for solar plant and TL does not comprise of any tribal land/ land parcels owned by members belonging to the Indigenous Peoples (IP) and there are no established dependency of tribals on the said land. Moreover, it is to be noted that there are no Scheduled Tribe population reported within the project village Koduru. Hence the proposed project is not expected to have impacts on indigenous people.

4 Environmental and Social Baseline Conditions

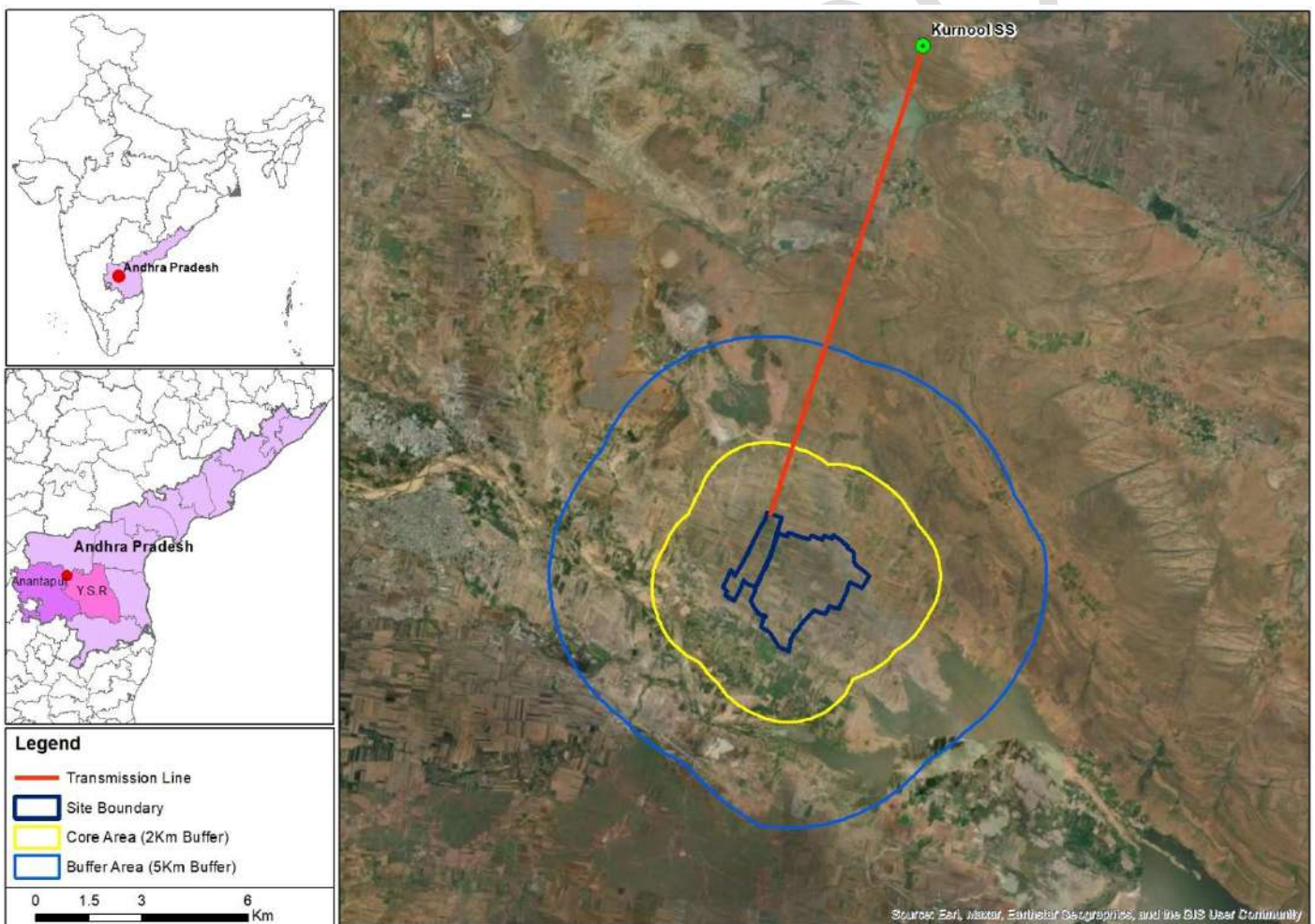
This section describes the existing environmental and social sensitivities of the study area (as described below). The sensitivities include the relevant components of the physical, biological, and socio-economic environment. The purpose of describing the environmental and social sensitivities of the study area is to:

- To describe the environmental characteristics of the project site and surrounding areas to identify key resources and receptors that will be affected by the Project during the scoping process
- To determine if any nearby communities or structures will be affected by the Project establishment; and
- To understand the significance of the different habitats within the AoI and its importance for sustaining species of conservation importance, in terms of providing habitat contiguity to the surrounding region and dependency of surrounding communities

4.1 Study Area

The study area of up to 5 km radius from the project boundary has been demarcated as study area (as presented in **Figure 4:1**) for the project by considering the extent of project impact in terms of water resources, human settlement, traffic management, and biodiversity.

Figure 4:1 Identified Study area for the Project



Source: Arc GIS Mapping

4.1.1 Project Footprint area

The project footprint is the area that may reasonably be expected to be physically touched by Project activities across all phases. The project footprint for the project include land used for setting up the power plant, storage area, site office, storage of material and equipment, and transmission line infrastructure.

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4.1.2 Area of Influence

The effects of the project and project activities on a particular resource or receptor will have spatial (distance) and temporal (time) dimensions, the scale of which is dependent on a number of actors, including:

- Nature of the activity
- Specific resource or receptor
- Sensitivity of that resource or receptor
- Whether the impact is direct or indirect (e.g., secondary effect)

The project's Aoi refers to the Project footprint area as well as to a larger area in its immediate vicinity. This includes the footprint of the associated project components, such as access road as well as the immediate surroundings that will see increased movement of vehicles, personnel, and land-use change. Most of the impacts will occur within the project footprint area as identified above. However, certain impacts can be further reaching in terms of extent.

The Aoi considered for the project with respect to environmental, social, and ecological resources was based on the following reach of impacts:

- **Ecological Parameters:** Based on identified sensitivity during desk-based review and site-based assessment, the study area for ecological assessment for solar power plant was demarcated as:
 - **Core Area:** Boundary of the proposed project, and the villages falling between project boundary and 2 km radius.
 - **Buffer Area:** 5 km radius from the project boundary.
- **Environmental Parameters:** The area of up to 5 km radius from the Project boundary including transmission line has been demarcated as study area or Area of Influence for the Project by considering the extent of project impact in terms of air quality, noise, water resources, human settlement, location of the access roads besides considering the actual land area which will be used for the facilities.
- **Social Parameters:** The AOI for the project is identified as area/ villages within 5 km radius from project site boundary and for the transmission line the villages on which the proposed TL transverse. The following reasoning for considering the 5 km are provided below:
 - The villages falling under the 5 km will be the direct receptors for migrant workers.
 - The villages will be the direct receptors due to increase in traffic during the construction phase.
 - The villages that the transmission line passes through will be directly impacted by it.

4.2 Physical Environmental Sensitivities and Baseline Conditions

4.2.1 Primary Environmental Monitoring

Primary environmental baseline monitoring was conducted within the study area by a National Accreditation Board for Testing and Calibration Laboratories (NABL) under the supervision of E&S Advisors to understand the baseline conditions of the project study area. Monitoring locations considered for the project has been presented in **Table 4-1**. Map showing monitoring locations has been presented in **Figure 4:2**.

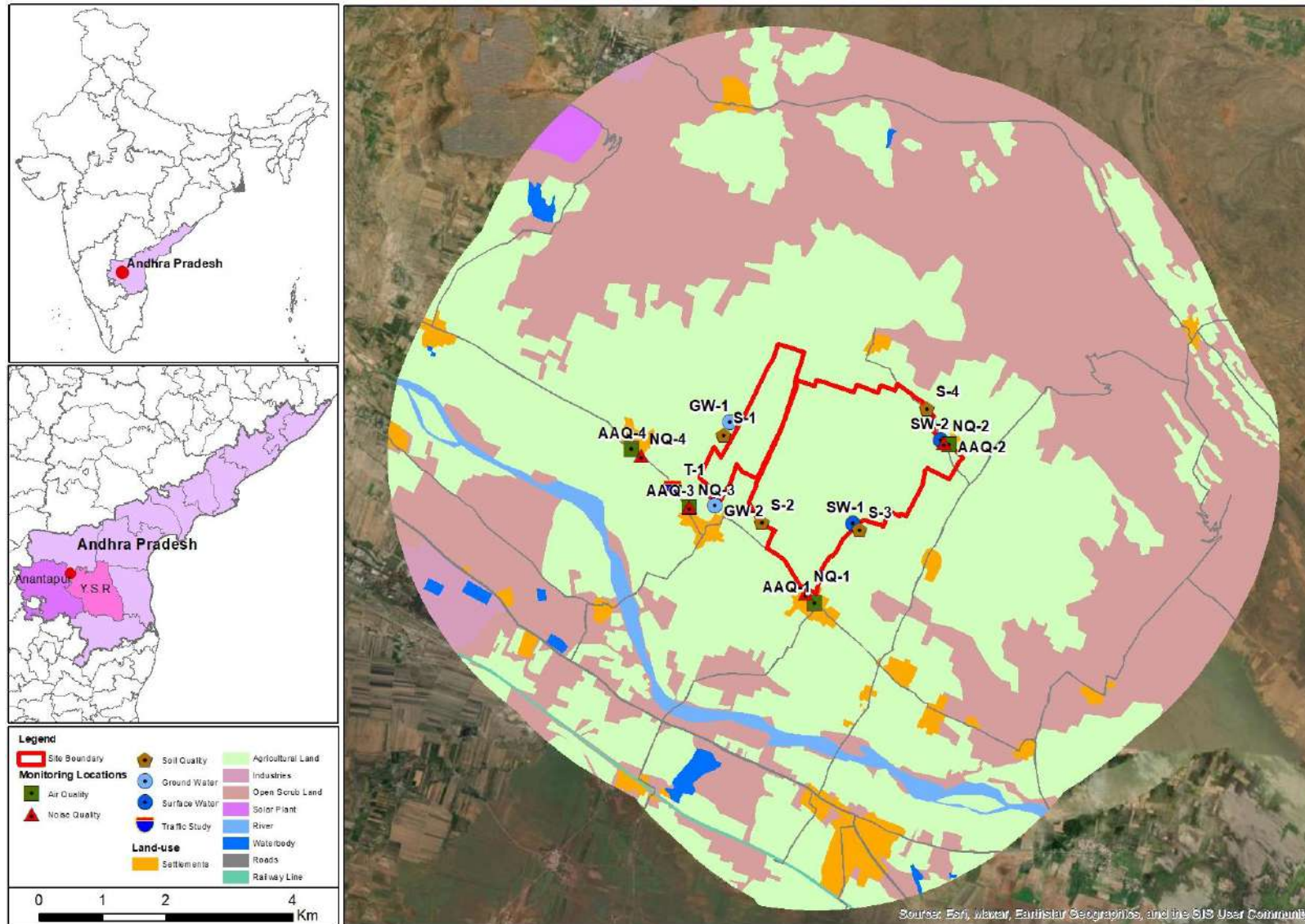
Table 4-1 Monitoring Locations considered for the Project

Parameter	Location Name of the Location Code	Coordinates	Location Criteria
Ground Water	GW 1 Velamalur	14°53'58.01"N, 78° 5'34.31"E	Water Collected from nearby borewell within the study area
	GW 2 Bodaipalle	14°53'15.28"N, 78° 5'26.91"E	
Surface Water	SW 1 Kodur	14°53'6.98"N, 78° 6'39.96"E	Water Collected from water ponds/pools to assess the surface water quality in the study area. There are no major surface waterbodies within the project area which may be impacted due to the project. Therefore, minor water pools/ponds located within 5 km radius were selected to assess the existing surface water quality.
	SW 2 Muragampalli	14°53'50.13"N, 78° 7'25.74"E	
Soil	S1 Velamalur	14°53'51.40"N, 78° 5'31.43"E	Soil samples were collected from downgradient and upgradient location relative to the project site. Additionally, soil samples were also collected within the project site to understand the soil quality of the project study area.
	S2 Bodaipalle	14°53'7.10"N, 78° 5'52.08"E	
	S3 Koduru	14°53'3.83"N, 78° 6'43.56"E	

	S4	Muragampalli	14°54'6.22"N, 78° 7'18.44"E	
Ambient Air	AAQ1	Koduru	14°52'25.62"N, 78° 6'20.26"E	Collected in and around project site to assess the baseline air quality for 24 hours. The locations were selected based on predominant wind direction in the study area.
	AAQ2	Muragampalli	14°53'48.00"N, 78° 7'30.16"E	
	AAQ3	Bodaipalle	14°53'14.05"N, 78° 5'13.64"E	
	AAQ4	Velamakur	14°53'43.54"N, 78° 4'42.75"E	
Ambient Noise	N1	Koduru	14°52'30.78"N, 78° 6'15.52"E	Once for 24 hours in and around project covering all directions in as per MoEFCC guidelines.
	N2	Muragampalli	14°53'48.47"N, 78° 7'27.45"E	
	N3	Bodaipalle	14°53'14.05"N, 78° 5'13.64"E	
	N4	Velamakur	14°53'40.21"N, 78° 4'47.83"E	
Traffic	T1	Bodaipalle	14°53'23.86"N, 78° 5'4.85"E	The access road are selected to estimate the total traffic on the roads since the same will be used during construction and operation phase by the Project SPVs

Source: Site Visit by E&S ADVISORS and NABL Accredited Lab

Figure 4:2 Map showing Primary Environmental Monitoring Locations within Project Study Area



Source: ArcGIS Mapping

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4.2.1.1 Ground Water Quality Assessment

As part of the ESIA, groundwater quality assessment was conducted by a NABL accredited lab to understand the groundwater quality in the study area of the Project. Two samples of groundwater were collected within 25 km radius of the Project. The water samples were collected by the lab under the supervision of E&S Advisors and the samples were analyzed against IS 10500:2012 drinking water standards adopted by Bureau of Indian Standards (BIS).

The results of the assessment have been presented in **Table 4-2**. The Ground water sampling is shown in **Figure 4:3**.

Figure 4:3 Ground water test and monitoring conducted in Study Area



Table 4-2 Results of Primary Groundwater Quality within Project Study Area

Sr. No.	Parameters	Unit	Ground Water Sample		Desirable Limit	Permissible Limit
			GW 1	GW 2		
Physical Parameters						
1.	Color	Hazen	BDL(DL:1.0)	BDL(DL:1.0)	5	5
2.	Odor	None	agreeable	agreeable	Agreeable	Agreeable
3.	Taste	None	agreeable	agreeable	Agreeable	Agreeable
3.	pH	None	8.00 at 25 deg C	7.55 at 25 deg C	6.5-8.5	No Relaxation
4.	Turbidity	NTU	BDL(DL:1.0)	BDL(DL:1.0)	1	5
5.	Total Dissolved Solid (TDS)	mg/l	434	1972	500	2000
General Parameters						
6.	Aluminum (Al)	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.03	0.2
7.	Ammonia (N)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	0.5	No Relaxation
8.	Anionic Detergent	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.2	0.01
9.	Boron (B)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	0.5	1
10.	Barium (Ba)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.7	No Relaxation

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Sr. No.	Parameters	Unit	Ground Water Sample		Desirable Limit	Permissible Limit
			GW 1	GW 2		
11.	Calcium (Ca)	mg/l	58	94	75	200
12.	Chloramines (Cl ₂)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	4	No Relaxation
13.	Chloride (Cl)	mg/l	103	377	250	1000
14.	Copper (Cu)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.05	1.5
15.	Fluoride (F)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	1	1.5
16.	Free Residual Chlorine	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	0.2	0.1
17.	Iron (Fe)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.3	No Relaxation
18.	Magnesium (Mg)	mg/l	22	35	30	100
19.	Manganese (Mn)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.1	0.3
20.	Mineral Oil	mg/l	BDL(DL :0.1)	BDL(DL :0.1)	0.5	No Relaxation
21.	Nitrate (NO ₃)	mg/l	7.3	12	45	No Relaxation
22.	Phenolic Compounds (C ₆ H ₅ OH)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	0.001	0.002
23.	Selenium (Se)	mg/l	BDL(DL:0.005)	BDL(DL:0.005)	0.01	No Relaxation
24.	Silver (Ag)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	0.1	No Relaxation
25.	Sulphate (SO ₄)	mg/l	24	72	200	400
26.	Hydrogen Sulphide (H ₂ S)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.05	No Relaxation
27.	Total Alkalinity	mg/l	248	426	200	600
28.	Total Hardness	mg/l	238	382	200	600
29.	Zinc (Zn)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	5	15
31.	Cadmium (Cd)	mg/l	BDL(DL:0.002)	BDL(DL:0.002)	0.003	No Relaxation
32.	Cyanide (CN)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	0.05	No Relaxation
33.	Lead (Pb)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.01	No Relaxation
34.	Mercury (Hg)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	0.001	No Relaxation
35.	Molybdenum (Mo)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.07	No Relaxation
36.	Nickel (Ni)	mg/l	BDL(DL:0.2)	BDL(DL:0.2)	0.02	No Relaxation
37.	Arsenic (As)	mg/l	BDL(DL:0.005)	BDL(DL:0.005)	0.01	0.05
39.	Polychlorinated Biphenyl (PCB)	mg/l	BDL(DL:0.0005)	BDL(DL:0.0005)	0.0005	No Relaxation
40.	Polynuclear Aromatic Hydrocarbons (PAH)	mg/l	BDL(DL:0.0001)	BDL(DL:0.0001)	0.0001	No Relaxation
Trihalomethanes						
41.	Bromoform	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.1	No Relaxation
42.	Dibromochloromethane	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.1	No Relaxation
43.	Bromodichloromethane	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.06	No Relaxation
44.	Chloroform	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	0.2	No Relaxation
Pesticides Residues						
45.	Alachlor	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	20	20

Sr. No.	Parameters	Unit	Ground Water Sample		Desirable Limit	Permissible Limit
			GW 1	GW 2		
46.	Atrazine	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	2	2
47.	Aldrin	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.03	0.03
48.	Dieldrin	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.03	0.03
49.	Alpha-HCH	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.01	0.01
50.	Beta-HCH	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.04	0.04
51.	Butachlor	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	125	125
52.	Chlorpyrifos	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	30	30
53.	Delta-HCH	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.04	0.04
54.	2,4-Dichlorophenoxyacetic acid	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	30	30
55.	o,p-DDD	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
56.	o,p-DDE	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
57.	o,p-DDT	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
58.	p,p-DDD	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
59.	p,p-DDE	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
60.	p,p-DDT	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	1	1
61.	Beta-Endosulfan	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.4	0.4
62.	Ethion	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	3	3
63.	Gama-HCH(Lindane)	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	2	2
64.	Isoproturon	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	9	9
65.	Malathion	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	190	190
66.	Methyl parathion	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.3	0.3
67.	Monocrotophos	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	1	1
68.	Phorate	µg/l	BDL(DL:0.02)	BDL(DL:0.02)	2	2
69.	Endosulfan sulfate	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.4	0.4
70.	Alpha -endosulfan	µg/l	BDL(DL:0.01)	BDL(DL:0.01)	0.4	0.4
Bacteriological Parameters						
71.	Total coliform bacteria	/100ml	not detected	detected	Not Detectable	Absent
72.	E.coli	/100ml	not detected	detected	Not Detectable	Absent

Source: NABL Accredited Lab

4.2.1.2 Analysis of Groundwater Quality Results

As per the above results, it was observed that most of the parameters were within the permissible limit except for the following:

- **Total Dissolved Solid (TDS):** The TDS in GW 2 was observed to be 1972 mg/l which exceeded desirable limits, whereas it was found to be 434 mg/l in GW 1 which was within permissible limit. The high TDS value may be attributed to presence of inorganic salts within the groundwater and intensive agriculture practices, including the use of fertilizers and pesticides, contribute to the elevated TDS levels as these chemicals leach into groundwater and surface water sources.

- **Calcium:** The concentration of calcium in GW 2 was observed to 94 mg/l which exceeded desirable limits and that in GW 1 was 58 which was found to be within both desirable and permissible limit. High concentration of calcium may be attributed to the presence of naturally occurring salts and minerals within the water samples.
- **Chloride:** The chloride concentration in GW 2 was observed to be 35 mg/l which was exceeding the desirable limits, whereas the chloride concentration in GW 1 was found to be within the limit. This can be attributed to soil weathering and dissolved salts from geological formations into the water samples.
- **Magnesium:** The concentration of magnesium in GW 2 was 35 mg/l which exceeded desirable limit. The concentration of magnesium in GW 1 was observed to be 22 mg/l which was within desirable and permissible limit. The high concentration of magnesium may be attributed to the high content of TDS in groundwater.
- **Total Alkalinity:** The total alkalinity of GW 1 and GW 2 was found to be 248 mg/l and 426 mg/l which was found to be exceeding the desirable limit of 200 mg/l whereas, both the values was found to be within the permissible limit. The high concentration of alkaline was due to high level of values in calcium, chloride and magnesium in the sample content.
- **Total Hardness:** The total hardness in GW 1 and GW 2 was observed to be 248 mg/l and 426 mg/l which exceeded desirable and limit, however, the samples were within the permissible limits. Total hardness of water is correlated to the presence of bivalent metallic ions viz. calcium and magnesium. Since the samples have higher concentration of magnesium, therefore, there is high concentration of total hardness in both samples.
- **Pesticides Residues:** The surrounding agricultural lands of the proposed solar power plant primarily involve rainfed agriculture, with crops such as cotton and groundnut being the main cultivation. The usage of pesticides for these crops is minimal, as evidenced by groundwater quality data, which indicates pesticide residues are below detectable limits.
- **Total coliform bacteria and E.coli:** Total coliform bacteria was detected in GW 2 sample. This may be due to presence of water borne pathogens within the sample.

4.2.1.3 Surface Water Quality Assessment

As part of the ESIA, surface water quality assessment was conducted by a National Accreditation Board for Testing and Calibration Laboratories (NABL) accredited lab in July 2024 to understand the surface water quality in the study area. Two samples of surface water were collected in and around the Project within 25 km radius under the supervision of E&S Advisors and the samples were analyzed against IS 10500:2012 standard.

The results of the assessment have been presented in **Table 4-3**. The Surface water sampling is shown in **Figure 4:4**

Figure 4:4 Surface water test and monitoring conducted in Study Area



Table 4-3 Results of Primary Surface Water Quality within Project Study Area

Sr. No.	Parameters	Unit	Surface Water Samples	Permissible Limit as per IS 2296 Inland surface Water class C
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		SW 1	SW 2		
1.	Color	Hazen	BDL(DL:1.0)	BDL(DL:1.0)	300
2.	pH	None	8.09 at 25 deg C	8.20 at 25 deg C	6.5-8.5
3.	Turbidity	NTU	12	39	-
4.	Arsenic (as As)	mg/l	BDL(DL:0.005)	BDL(DL:0.005)	
5.	Barium (as Ba)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	
6.	Total Dissolved Solid (TDS)	mg/l	412	219	1500 max
7.	Calcium (Ca)	mg/l	34	31	-
8.	Chloride (Cl)	mg/l	112	32	600
9.	Copper (Cu)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	-
10.	Fluoride (F)	mg/l	BDL(DL:0.1)	BDL(DL:0.1)	1.5
11.	Iron (Fe)	mg/l	BDL(DL:0.05)	BDL(DL:0.05)	50
12.	Magnesium (Mg)	mg/l	17	19	-
13.	Manganese (Mn)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	-
14.	Nitrate (NO3)	mg/l	BDL(DL:0.2)	BDL(DL:0.02)	50
15.	Phenolic Compounds (C6H5OH)	mg/l	BDL(DL:0.001)	BDL(DL:0.001)	-
16.	Sulphate (SO4)	mg/l	8.4	22	400
17.	Total Alkalinity	mg/l	210	135	-
18.	Total Hardness	mg/l	156	85	-
19.	Zinc (Zn)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	15
20.	Cobalt (Co)	mg/l			-
21.	Total Suspended Solid (as TSS)	mg/l	38.0	176	-
22.	Temperature	Deg C	25	25	-
23.	Conductivity	Us/cm	834	356	-
24.	Biochemical Oxygen Demand (as BOD)	mg/l	BDL(DL:2.0)	3.8	3
25.	Chemical Oxygen Demand (COD)	mg/l	BDL(DL:4.0)	12	-
26.	Oil and Grease	mg/l	BDL(DL:3.0)	BDL(DL:3.0)	0.1
27.	Salinity	None	0.16ppt(with respect to KCl)	0.10ppt (with respect to KCl))	-
28.	Phosphate (as PO4)	mg/l	BDL(DL:0.01)	BDL(DL:0.01)	-
29.	DO	mg/l	5.8	5.7	4 Minimum
30.	Cadmium (Cd)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.01
31.	Lead (Pb)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	0.1
32.	Mercury (Hg)	mg/l	BDL(DL:0.0002)	BDL(DL:0.0002)	-
33.	Nickel (Ni)	mg/l	BDL(DL:0.02)	BDL(DL:0.02)	-
34.	Chromium (Cr)	mg/l	BDL(DL:0.3)	BDL(DL:0.3)	0.05
35.	Faecal coliform	/100ml	2	<2.0	-
36.	Total coliform	/100ml	4	<2.0	5000

Source: NABL Accredited Lab

4.2.1.4 Analysis of Surface Water Quality Monitoring

As per the above results, majority of the parameters in the water samples were within limit as per Water Quality Standards (IS 2296, Class C) except for the following.

- Biochemical Oxygen Demand :** The Biochemical Oxygen Demand (BOD) in the water sample SW2 were found to be 3.2 mg/l () which exceeded the permissible limit of 3 mg/l. This can be attributed to the fact that the discharge of organic waste from domestic sewage, agricultural runoff, and industrial effluents introduces a high load of organic matter into the water.

4.2.1.5 Soil Quality Assessment

Soil characteristics within the study area, especially the physical quality of the soil has been characterized by analysing soil samples collected from four (04) locations under the supervision of E&S Advisors through a NABL accredited Lab in July 2024. Soil analysis and results have been presented in **Table 4-4**. The Soil test sampling is shown in **Figure 4:5**

Figure 4:5 Soil test and monitoring conducted in Study Area



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Table 4-4 Results of Soil Sampling in Study Area

Sr. No.	Parameter	Units	S1	S2	S3	S4	Method
1.	pH Value	None	7.89(1:2.5)at 25 deg C	7.34(1:2.5)at 25 deg C	7.86(1:2.5)at 25 deg C	7.04(1:2.5)at 25 deg C	IS 2720 (Part 26) -1987, Rffm : 2011
2.	Texture	None	LOMY SAND	SANDY LOAM	LOMY SAND	SANDY LOAM	TPM/MSK/P&E/1/36A
3.	Electrical Conductivity (1:2.5) at 25°C	µs/cm	450 (1:2) at 25 deg C	2460 (1:2) at 25 deg C	1087(1:2) at 25 deg C	180(1:2)at 25 deg C	IS 14767:2000, RA2016
4.	Permeability	Cm/hr	6	8	9	7	IS 2720 (Part 17) -1986, Rffm : 2011
5.	Phosphate (as PO4)	None	Available Phosphate (PO4 - 3)= 11.0	Available Phosphate (PO4 - 3)=48.0	Available Phosphate (PO4 - 3)= 160.0	Available Phosphate (PO4 - 3)= 62.0	TPM/MSK/P&E/1/12
6.	Sand	%	SAND:84%	54%	82%	60%	TPM/MSK/P&E/1/36A
7.	Silt	%	10%	27%	11%	22%	TPM/MSK/P&E/1/36A
8.	Clay	%	6%	19%	7%	18%	TPM/MSK/P&E/1/36A
9.	Porosity	Mg/kg	45	50	48	42	TPM/MSK/P&E/1/30
10.	Nitrites (as NO2)	mg/kg	14	18	15	9.5	TPM/MSK/P&E/1/20
11.	Nitrates (as NO3)	%	120	238	154	140	TPM/MSK/P&E/1/19
12.	Total Petroleum Hydrocarbon as TPH	%	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	IS 3025 (Part 39)-1991, Rffm : 2014
13.	Iron (as Fe)	%	6.7	7.5	7.4	6.8	EPA 6010D
14.	Lead (as Pb)	%	4.6	6.5	5.6	5.4	EPA 6010D
15.	Manganese (as Mn)	mg/kg	189.7	201.9	226.8	137.7	EPA 6010D
16.	Nickel (as Ni)	mg/kg	9.6	22.9	27.5	23.2	EPA 6010D
17.	Barium (as Ba)	mg/kg	97	78	77.5	87.5	EPA 6010D
18.	Zinc (as Zn)	mg/kg	8.9	16.7	10.3	9.7	EPA 6010D
19.	Copper (as Cu)	mg/kg	4.8	8.5	8.8	12	EPA 6010D
20.	Cadmium (as Cd)	mg/kg	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	BDL(DL:2.0)	EPA 6010D
21.	Total Chromium (as Cr)	mg/kg					EPA 6010D
22.	Arsenic (as As)	mg/kg	BDL(DL:0.25)	BDL(DL:0.25)	BDL(DL:0.25)	BDL(DL:0.25)	EPA 6010D
23.	Mercury (as Hg)	mg/kg	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	BDL(DL:0.1)	USEPA 245.5
24.	Total Hydrocarbon	mg/kg	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	BDL(DL:1.0)	IS 3025 (Part 39)-1991, Rffm : 2014
25.	Cation Exchange Capacity	mg/kg	8.4	13	10	9.6	IS 2720 (Part 24)-1976, Rffm : 2015

Source: NABL Accredited Lab

Table 4-5 Soil Classification Standards

S.No.	Soil Test Parameters	Classification
1	pH	<4.5 Extremely acidic 4.51-5.00 Very strongly acidic 5.00-5.50 slightly acidic 5.51-6.0 moderately acidic 6.01-6.50 slightly acidic 6.51-7.30 Neutral 7.31-7.80 slightly alkaline 7.81-8.50 moderately alkaline 8.51-9.0 strongly alkaline 9.01 very strongly alkaline
2	Salinity Electrical Conductivity (mmhos/cm) (1 ppm = 640 mhos/cm)	Up to 1.00 Average 1.01-2.00 harmful to germination 2.01-3.00 harmful to crops (sensitive to salts)
3	Organic Carbon	Up to 0.2: very less 0.21-0.4: less 0.41-0.5 medium, 0.51-0.8: on an average sufficient 0.81-1.00: sufficient >1.0 more than sufficient
4	Nitrogen (kg/ha)	Up to 50 very less 51-100 less 101-150 good 151-300 Better >300 sufficient
5	Phosphorus (kg/ha)	Up to 15 very less 16-30 less 31-50 medium, 51-65 on an average sufficient 66-80 sufficient >80 more than sufficient
6	Potash (kg/ha)	0-120 very less 120-180 less 181-240 medium 241-300 average 301-360 better >360 more than sufficient

Source: Handbook of agriculture, Indian Council of Agricultural Research, New Delhi, India

4.2.1.6 Analysis of Soil Quality Monitoring

The analysis of the soil quality assessment has been provided below.

- **pH:** The pH value of the four soil samples were found to be 7.89 (S1), 7.34 (S2), 7.86 (S3), 7.04 (S4). As per the standard soil classification, the soil in the project area is slightly alkaline in nature.
- **Texture:** The texture of all the soil samples were found to be Loamy and Sandy in nature with small and fine particles due to which it has high water retention capacity.

- **Electrical Conductivity (EC):** EC is used to estimate the salinity in soil. The electrical conductivity of the soil samples were found to be 450 $\mu\text{s}/\text{cm}$ (S1), 2460 $\mu\text{s}/\text{cm}$ (S2), 1087 $\mu\text{s}/\text{cm}$ (S3), 180 $\mu\text{s}/\text{cm}$ (S4) which indicated that samples S2 and S3 were found to be high concentration of nutrients and high salinity in the soil samples.
- **Metals:** Iron, copper and zinc are important soil micronutrients considered essential for the normal growth of plants. Deficiencies of micronutrient drastically affect plant growth and metabolism. The level of iron in the soil samples were found to be 6.7mg/kg (S1), 7.5 mg/kg (S2), 7.4 mg/kg (S3) and 6.8 mg/kg (S4) indicating low concentration of iron in all the soil samples. The concentration of copper in the soil samples were found to be 4.8 mg/kg (S1), 8.5 mg/kg (S2), 8.8mg/kg (S3), 12 mg/kg (S4) indicating optimum concentration of copper in all the samples. The level of zinc in the soil samples were found to be 8.9 mg/kg (S1), 16.7 mg/kg (S2), 10.3 mg/kg (S3), 9.7 mg/kg (S4) indicating low concentration of copper in all the soil samples.

4.2.1.7 Ambient Air Quality Assessment

Existing ambient air quality of the study area was monitored at four (04) locations for 24 hours²⁰. Air quality samples were collected by NABL accredited lab by installation of air quality monitoring device under the supervision of E&S Advisors. The monitoring parameters, including Respirable Particulate Matter (RPM) i.e. PM₁₀ (particulate matter of particle size less than 10 micrometers) and PM_{2.5} (particulate matter of particle size less than 2.5 micrometers), Sulphur Dioxide (SO₂), Oxides of Nitrogen (NO_x) and Carbon Monoxide (CO). PM₁₀, PM_{2.5}, SO₂ and NO_x, were monitored on 24 hourly basis, while CO was monitored on 8 hourly basis in the study area.

The results of the air quality monitoring have been presented in **Table 4-6**. The Ambient Air Quality test sampling is shown in **Figure 4:6**

Figure 4:6 Ambient air quality test and monitoring conducted in Study Area



²⁰ Considering solar power projects are less polluting source of energy and development and operation of the Project will have limited to negligible impact on the existing ambient air quality. Therefore, monitoring has been conducted for 24 hours to understand the existing baseline conditions.

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Table 4-6 Results of Ambient Air Quality Monitoring in Study Area

Parameter	Units	Air Quality Samples				National Ambient Air Quality Standards (NAAQS) Permissible Limits ($\mu\text{g}/\text{m}^3$)	IFC/WB Ambient Air Quality Standards (WHO Guidelines)
		AAQ1	AAQ2	AAQ3	AAQ4		
Particulate matter (PM 10)	$\mu\text{g}/\text{m}^3$	74	68	75	74	100 (24 Hours)	24 hour values <ul style="list-style-type: none"> • 150 (Interim target 1) • 100 (Interim target 2) • 75 (Interim target 3) • 50 (IFC EHS guideline)
Particulate matter (PM 2.5) in $\mu\text{g}/\text{m}^3$	$\mu\text{g}/\text{m}^3$	49	45	37	34	60 (24 Hours)	24 hour values <ol style="list-style-type: none"> 1. 75 (Interim target 1) 2. 50 (Interim target 2) 3. 37.5 (Interim target 3) 4. 25 (IFC EHS guideline)
Sulphur dioxide (SO ₂)	$\mu\text{g}/\text{m}^3$	10.1	9.5	10.2	9.6	80 (24 Hours)	24 hour values <ul style="list-style-type: none"> • 125 (Interim target 1) • 50 (Interim target 2) • 20 (IFC EHS guideline)
Nitrogen dioxide (NO ₂)	$\mu\text{g}/\text{m}^3$	15	15	14.8	17.5	80 (24 Hours)	<ul style="list-style-type: none"> • 1 year: 40 (IFC EHS guideline) • 1 hour: 200 (IFC EHS guideline)
Carbon monoxide (CO)	mg/m^3	0.47	0.50	0.49	0.47	2 (8 hours)	-

4.2.1.8 Analysis of Ambient Air Quality Monitoring

As per the above results, all the parameters were found to be within NAAQS CPCB permissible limit. However, the levels of PM 10 in AAQ1, AAQ2, AAQ3, and AAQ4 exceeded the standards as per IFC EHS guidelines value but were within the Interim Target-3 values. Similarly, the PM 2.5 levels in AAQ1, AAQ2, AAQ3 and AAQ4 exceeded the standards as per IFC EHS guidelines value but were within the Interim Target-3 values.

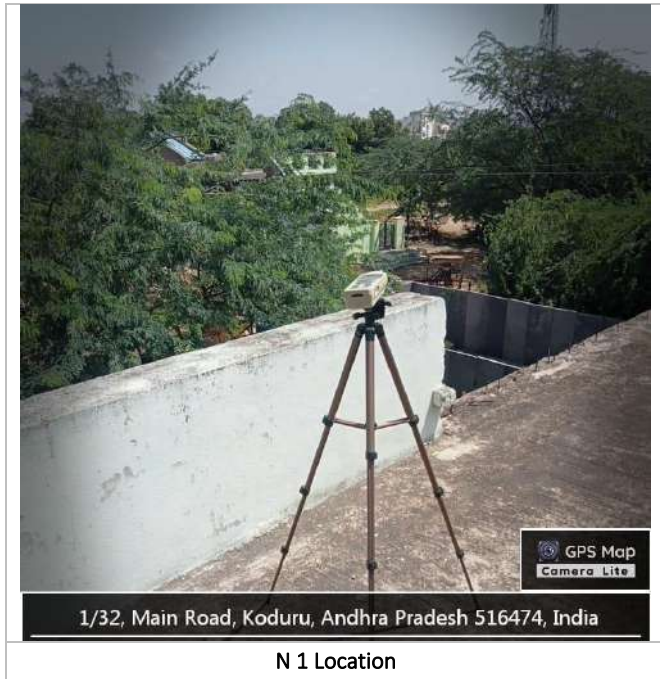
4.2.1.9 Noise Quality Assessment

Noise levels were recorded at four locations once during the study period with the aid of a digital noise level meter. Noise levels were recorded for 24 hours²¹ and the noise quality has been reported as Leqday and Leqnight for each of the locations. Daytime is considered from 0600 to 2200 hours and night from 2200 to 0600 hours. Since the Project is located in an area where there are some settlements, institutions located within 10 km radius, therefore, noise levels have been assessed against national and international standards for residential area, considering renewable energy projects will be developed in the project vicinity. The results of the ambient noise monitoring have been presented in **Table 4-7**. The Noise Quality sampling is shown in **Figure 4:7**

²¹ IFC EHS guidelines recommends 48 hours of sampling including one weekday and one weekend which is typically applicable to urban areas. However, since the monitoring has been conducted in area with no settlements, institutions, commercial shops within 10 km, therefore only 24 hours sampling has been considered. The location has been considered as industrial area.

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Figure 4:7 Noise Quality test and monitoring conducted in Study Area



N 1 Location

Table 4-7 Ambient Noise Quality Monitoring in Study Area

Sr. No.	Sampling ID	Results Leq dB(A)		CPCB Limit, Residential Area Leq dB(A)		Limit as per EHS guidelines of IFC, Residential, commercial area (Leq hourly)	
		Leq Day	Leq Night	Leq Day	Leq Night	Leq Day	Leq Night
1.	N1	48.2	41.7	55	45	55	45
2.	N2	41.6	38	55	45	55	45
3.	N3	44.7	36.2	55	45	55	45
4.	N4	42.7	38.2	55	45	55	45

Source: NABL Accredited Lab

4.2.1.10 Analysis of Noise Quality Monitoring

As per the above results, the Leq Day and Leq Night values of all the samples were found to be within CPCB limits as well as IFC standards for industrial area.

4.2.1.11 Traffic Survey

The primary traffic survey was conducted on the road. It is expected that during construction and operation phase of the project, materials and equipment will be transported to site through these roads. Therefore, to understand the existing traffic (up and down) on these roads a primary traffic survey was conducted by a NABL accredited lab for 24 hours. The results of the survey has been presented in **Table 4-8**.

Table 4-8 Traffic Density Monitoring Results in Study Area

Sr. No.	Time (Hours)	Motorized Vehicles			Total Vehicles
		Heavy Motor Vehicles (Truck, Bus, Dumper, Tanker, Trailer)	Light Motor Vehicles (Car, Jeep, Van, Metador, Tractor, Tempo)	Two/Three Wheelers (Scooter, M. Cycle, Auto, Moped)	
T1 (Up + Down)					
1.	10.00-11.00	1	5	30	36
2.	11.00-12.00	1	2	20	23
3.	12.00-13.00	2	4	30	36
4.	13.00-14.00	0	2	10	12
5.	14.00-15.00	1	6	30	37
6.	15.00-16.00	3	7	20	30
7.	16.00-17.00	4	5	10	19
8.	17.00-18.00	6	6	30	42
9.	18.00-19.00	3	4	40	47
10.	19.00-20.00	0	3	10	13
11.	20.00-21.00	0	7	15	22
12.	21.00-22.00	0	6	20	26
13.	22.00-23.00	0	4	0	4
14.	23.00-00.00	0	1	0	1
15.	00.00-01.00	0	0	1	1
16.	01.00-02.00	0	0	1	1
17.	02.00-03.00	0	0	0	0
18.	03.00-04.00	0	0	0	0
19.	04.00-05.00	0	0	0	0
20.	05.00-06.00	0	1	10	11
21.	06.00-07.00	0	2	30	32
22.	07.00-08.00	0	1	40	41
23.	08.00-09.00	0	2	25	27
24.	09.00-10.00	0	4	20	24
Total		21	72	392	485

Source: NABL Accredited Lab

4.2.1.12 Analysis of Traffic Survey

Based on the traffic survey data, it was observed that the road is busier during morning and evening time between 8.00 to 10.00 and 17.00 to 22.00. The traffic scenario depicted that the majority of traffic in the road is during 10:00 to 22:00 due to movement of Two/Three Wheelers (Scooter, M. Cycle, Auto, Moped) . There was no movement of non-motorised vehicles on both the roads. The deployment of heavy motor vehicles on the roads was due to initiation of construction work by SAEL.

4.2.2 Review of Secondary Information

To establish the environmental baseline for the study area, a review of the secondary information along with primary site observations was carried out based on data available in the public domain. The list of secondary sources of information used for developing the environmental baseline has been presented **Table 4-9**.

Table 4-9 Sources of Secondary Information

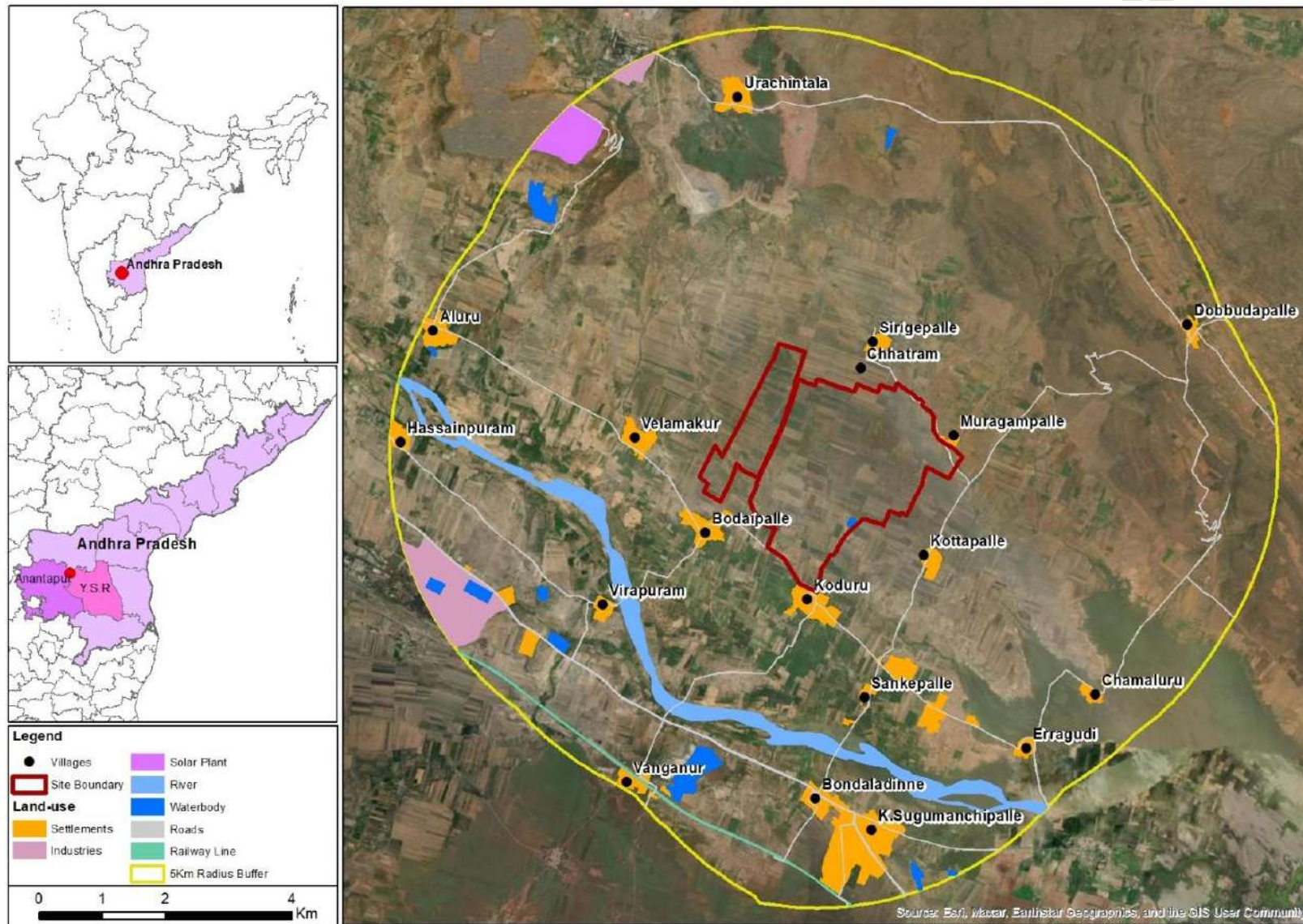
Sr. No.	Parameter	Secondary Information Source
1.	Physical Features within Study Area	Google Earth Imagery and Arc GIS Mapping
2.	Meteorological data	India Meteorological Department (IMD), National Institute of Wind Energy
3.	Geology and hydrogeology	Central Ground Water Board
4.	Land use	Through Satellite Imageries and Arc GIS Mapping
5.	Soil Type and Water Resources	Central Ground Water Board
6.	Natural Hazards	Disaster Management, Relief & Civil Defense Department, Government of Andhra Pradesh, and Building Materials & Technology Promotion Council (BMTPC), Government of India

4.2.2.1 Physical Features

The physical features map of the study area of the project has been showcased in **Figure 4:8**. The map displays the following features that are located within 5 km radius of the Project

- The location of the proposed Project sites
- Settlements located in Study area
- Road network within study area
- Railway line
- Industries
- Water Body
- River
- Solar Plant

Figure 4:8 Map showing physical features within Project Study Area



Source: Arc GIS Mapping

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4.2.2.2 Climate and Meteorology

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, the district exhibits a tropical wet and dry climate with consistently high temperatures through-out the year. The mean daily minimum and maximum temperatures ranges from 25°C to 40°C in December and May, respectively. According to the IMD Climatological Tables (1991-2020), in YSR Kadapa district the highest temperature (43.3°C) over the last 20 years was observed during the month of May and the lowest temperature (15.7 °C) was observed during the month of December (refer).

Table 4-10 Meteorological Data for YSR Kadapa District from IMD (1991-2020)

Month	Temperature (°C)				Relative Humidity		Rainfall		Wind	
	Mean Max	Mean Min	Highest	Lowest	Max	Min	Monthly	No of rainy days	Mean wind speed	Direction
Jan	32.3	18.6	34.9	15.7	73	52	0.6	0.1	5.6	E
Feb	35.2	20.4	38.0	17.6	69	43	0.4	0.1	5.7	E
Mar	38.8	23.9	41.6	20.9	61	33	6.7	0.5	5.9	E
Apr	40.8	26.9	43.1	23.5	56	31	16.3	1.0	6.2	E
May	40.5	27.7	43.3	23.3	56	35	47.6	2.2	6.3	E
Jun	37.3	26.6	41.0	23.4	62	46	78.5	4.2	6.4	W
Jul	34.9	25.4	38.1	23.2	66	52	109.8	6.2	6.5	W
Aug	33.7	25.0	36.5	23.0	70	56	115.2	6.5	6.2	W
Sep	33.4	24.5	36.6	22.4	71	58	153.4	6.9	5.6	W
Oct	32.4	23.8	35.7	20.9	74	64	147.4	6.7	5.0	W
Nov	31.2	21.1	33.8	18.0	79	66	64.2	4.0	4.6	E
Dec	30.5	18.5	32.3	15.9	79	61	18.5	1.3	4.9	E

Source: IMD – Climatological Tables 1991-2020

According to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, the district experiences hot summers and generally dry weather conditions. The normal mean daily minimum and maximum temperature are 26°C and 38.3°C during May and 17.1°C and 30.2°C during January. According to the IMD Climatological Tables (1991-2020), in Anantapuram district the highest temperature (42.2°C) over the last 20 years was observed during the month of May and the lowest temperature (13.3°C) was observed during the month of December and January (refer).

Table 4-11 Meteorological Data for Ananthapuram District from IMD (1991-2020)

Month	Temperature (°C)				Relative Humidity		Rainfall		Wind	
	Mean Max	Mean Min	Highest	Lowest	Max	Min	Monthly	No of rainy days	Mean wind speed	Direction
Jan	31.5	17.2	34.5	13.3	72	35	2.4	0.2	6.3	E
Feb	34.5	19.1	37.7	14.9	61	28	0.8	0.2	6.4	E
Mar	38.1	22.4	40.8	18.0	55	25	4.6	0.2	6.9	E
Apr	39.8	25.6	42.2	21.2	56	25	24.5	1.6	7.4	E
May	39.4	26.1	42.3	21.7	62	32	58.9	3.1	11.6	W
Jun	35.7	24.9	39.4	22.5	68	46	68.1	4.0	16.3	W
Jul	33.9	24.2	37.0	22.2	70	51	65.6	4.5	18.0	W

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Aug	33.2	23.8	36.2	22.2	74	54	91.2	5.2	16.2	W
Sep	33.0	23.3	36.2	21.4	76	55	137.1	7.0	10.8	W
Oct	32.4	22.4	35.1	19.5	76	57	111.7	6.2	6.0	E
Nov	30.8	20.1	33.5	15.5	76	54	28.5	2.8	5.6	E
Dec	30.1	17.4	32.5	13.3	78	47	8.5	0.7	5.8	E

Source: IMD – Climatological Tables 1991-2020

4.2.2.3 Rainfall

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, rainfall occurs during both the Southwest and Northeast monsoons, typically from June to October, with an average annual normal rainfall of 700 mm. Normal annual rainfall varies between 502 mm (Vemula) to 927 mm (Kodur) with average of 710 mm. SW monsoon contributes 56% and 36% is contributed by retreating monsoon (NE) season and rest by winter and summer rainfall. Rainfall increases from west to east. According to the IMD Climatological Tables (1991-2020), over the last 20 years in YSR Kadapa district the highest rainfall (153.4 mm) was received during the month of September with 6.9 rainy days and the lowest rainfall (0.4 mm) was received during the month of February with 0.1 rain days (refer).

According to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, The district's normal annual rainfall is 573 mm, varying across different areas, with contributions from the Southwest monsoon, Northeast monsoon, and winter season. The rainfall tends to increase from west to east, with low rainfall recorded in central and northwestern parts. During specific years, the district experienced variations in rainfall, such as 23% increase in rainfall in 2015 compared to 2014. According to the Central Ground Water Yearbook, Tadpatri Mandal, Ananthapuram District, Andhra Pradesh 2016, the average rainfall in the mandal is reported as 667 mm. The rainfall during the South-west monsoon season i.e., June-September accounts for about 85% of the total rainfall. According to the IMD Climatological Tables (1991-2020), over the last 20 years in Ananthapuram district the highest rainfall (137.1 mm) was received during the month of September with 7 rain days with and the lowest rainfall (0.8 mm) was received during the month of February with 0.2 rain days (refer).

4.2.2.4 Wind

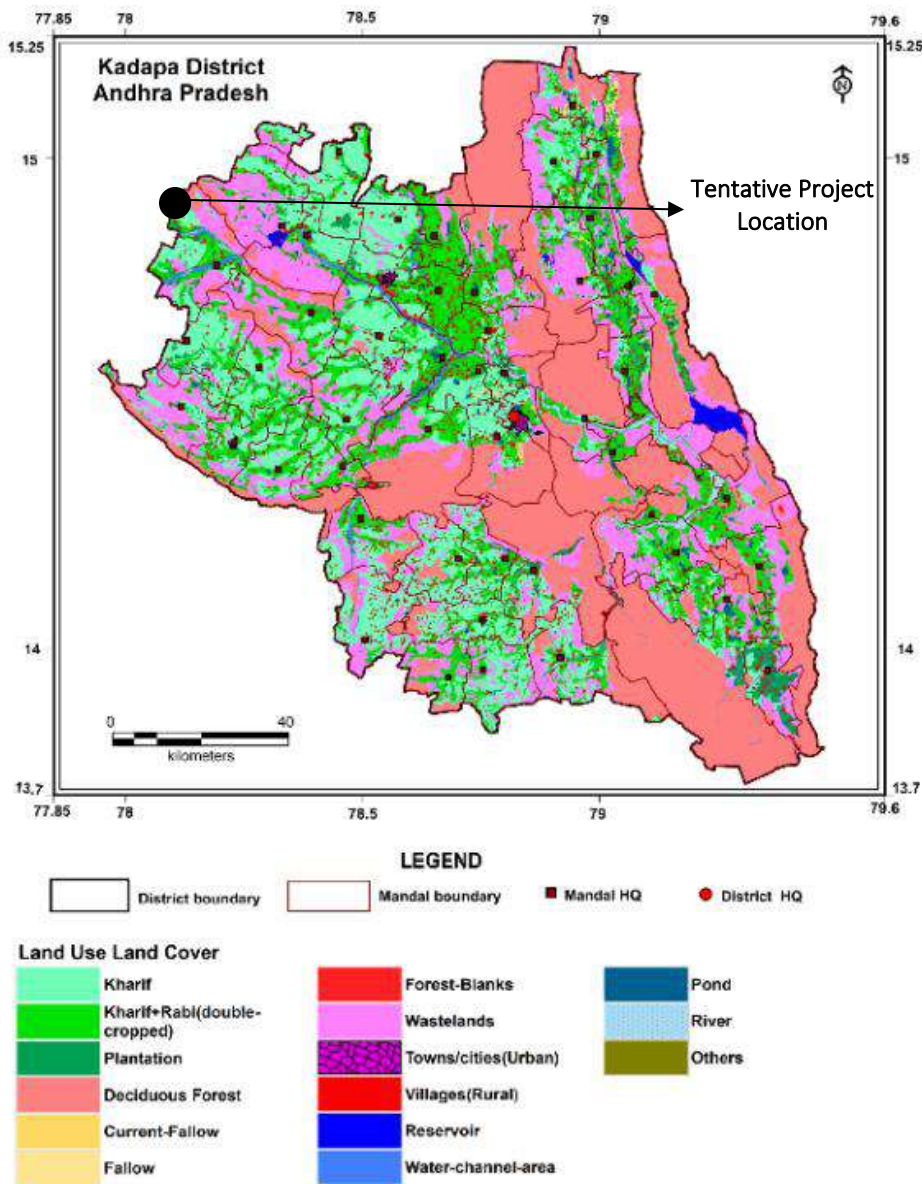
As per the above data in , over the last 20 years YSR Kadapa district experiences highest wind speed in the month July i.e., 18 m/s from West. The minimum wind speed in the district is experienced in the month November i.e., 4.6 m/s from East.

As per the above data in , over the last 20 years Ananthapuram district experiences highest wind speed in the month July i.e., 6.5 m/s from West. The minimum wind speed in the district is experienced in the month November i.e., 5.6 m/s from East.

4.2.2.5 Land Use

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, forests cover approximately 33% of the total geographical area. Barren and uncultivable land comprise 14%, and land used for non-agricultural purposes occupying 12%. Cultivated land spans around 6.1 lakh hectares, with 19% (2.9 lakh hectares) utilized for double cropping. The net area sown is approximately 3,04,078 hectares, with an additional 24,543 hectares sown more than once, resulting in a total cropped area of 2,79,535 hectares. The land use map of YSR Kadapa District is shown in **Figure 4:9**.

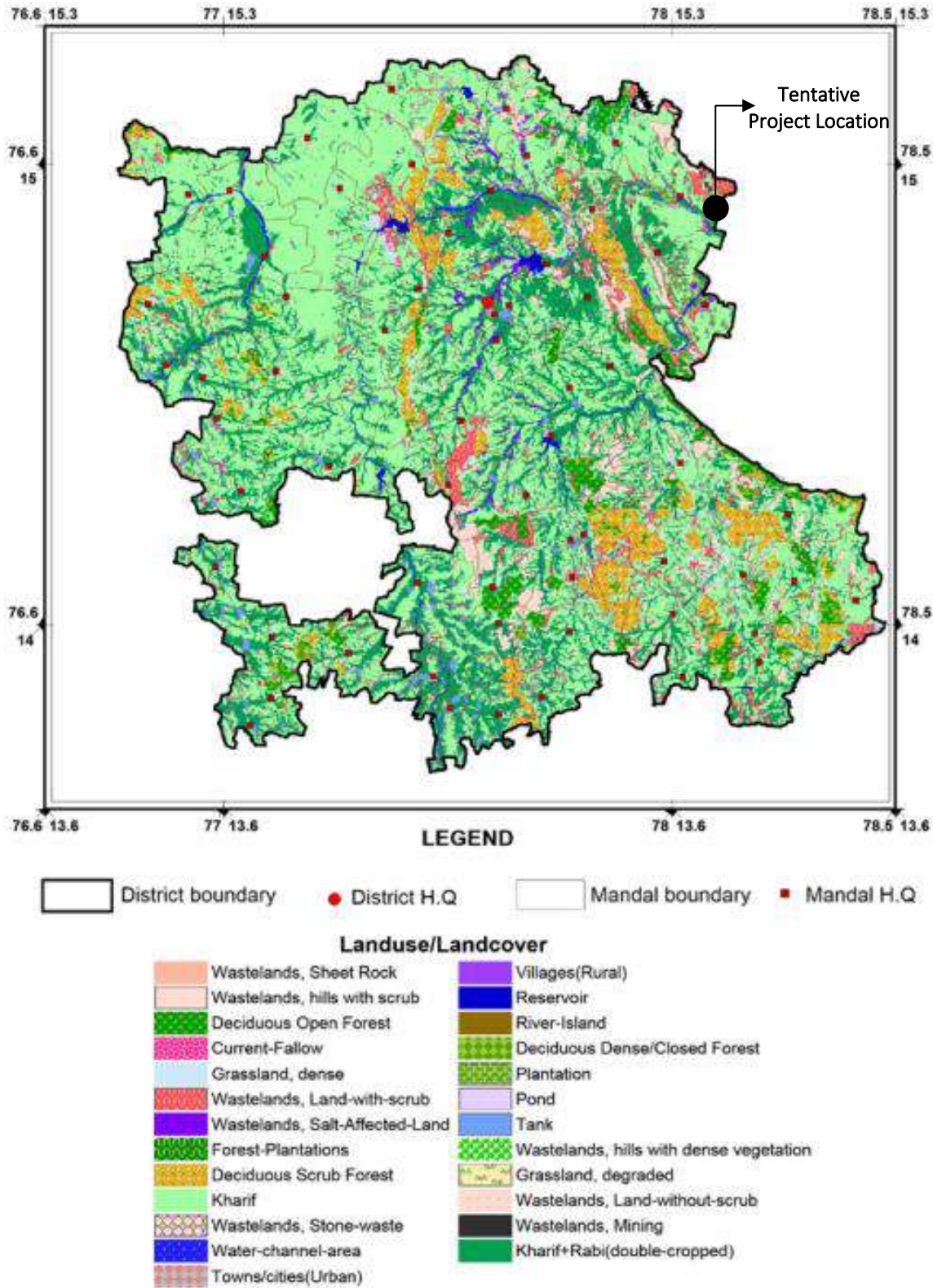
Figure 4:9 Land use for YSR Kadapa District



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

According to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, the district features a larger total cropped area of 11,06,371 hectares, constituting approximately 58% of the total geographical area, with 3.5% (67,391 hectares) utilized for multiple cropping. Forests cover around 10% of the area, while barren and cultivable land accounts for 8.7%, and land used for non-agricultural purposes comprises 7.9%. Cultivable waste occupies 2.5% of the total geographical area. According to the Central Ground Water Yearbook, Tadpatri Mandal, Ananthapuram District, Andhra Pradesh 2016, out of the total geographical area of 436 sq.km, the net area sown is 175.92 sq.km. Barren and uncultivable land is 48.7 sq.km. The land for nonagricultural use accounts for 42.5 sq.km. The land use map of Ananthapuram District is shown in **Figure 4:10**.

Figure 4:10 Land use for Ananthapuram District



Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

The land use pattern of the study area is shown in .

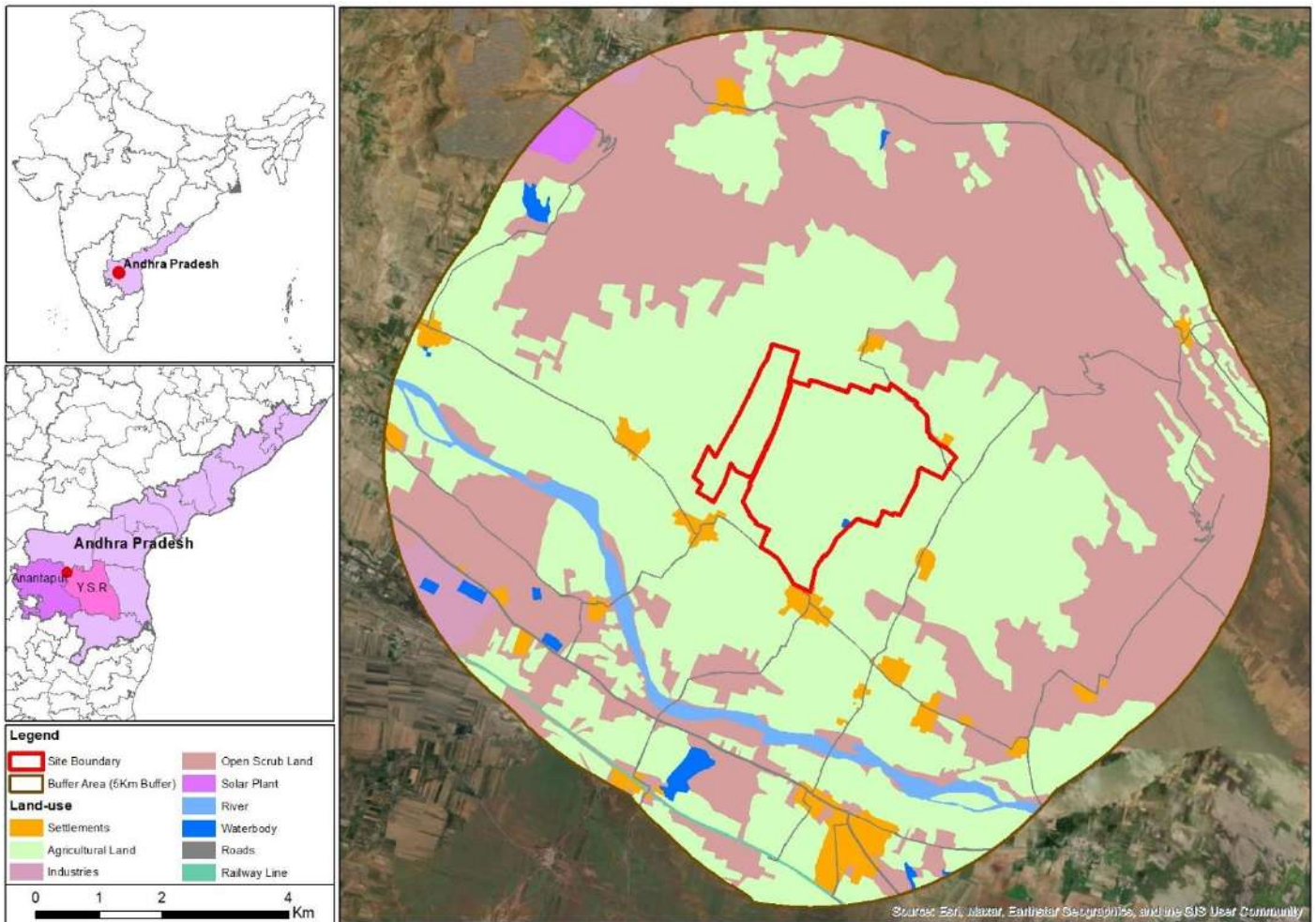
Table 4-12 Land use Pattern of the Study Area

Sr. No.	Land use Category	Area (sq km)	%
1.	Agricultural Land	71.17	49.89
2.	Settlements	3.45	2.42
3.	Open scrub Land	60.84	42.65
4.	River	2.61	1.83
5.	Waterbody	0.84	0.59
6.	Solar Plant	0.59	0.41
7.	Roads	1.57	1.10
8.	Railway Line	0.23	0.16
9.	Industries Land	1.33	0.93
Total Area (sq km)		142.65	100.00

Source: ArcGIS Mapping

The **Figure 4:11** shows majority of the land use pattern of the study area falls under the category of is Agricultural Land.

Figure 4:11 Map Showing Land Use Pattern of the Study Area



Source: Arc GIS Mapping

4.2.2.6 Topography

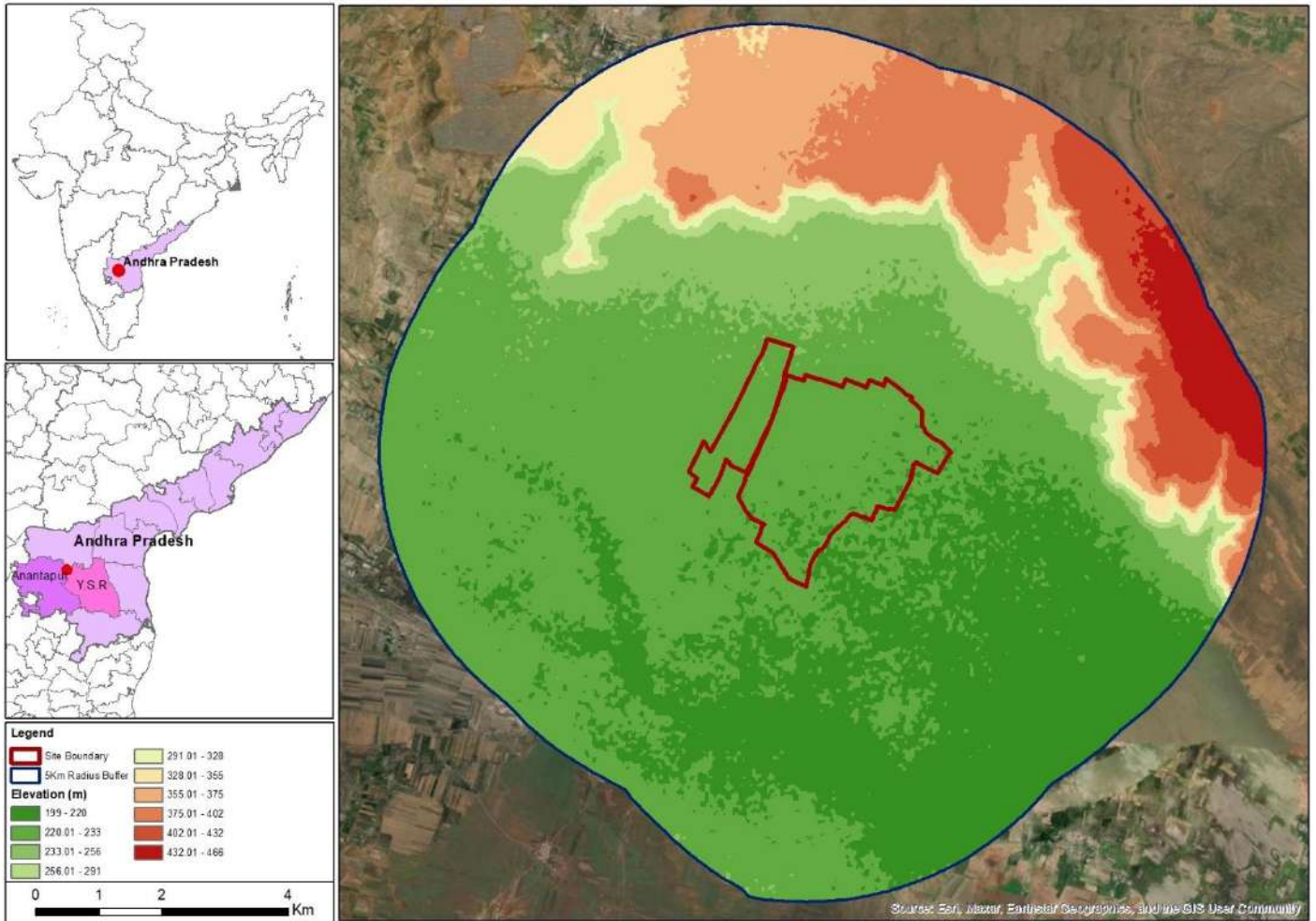
According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, the topography is characterized by rolling terrain comprising high and deep-fronted hill ranges, valleys, and plains. High hill ranges with intervening valleys are predominant in the eastern part, while the northern region is occupied by densely forested medium hill ranges. The southern part features a plateau, with the major slope of the district generally oriented towards the east, except for the southern part where it slopes towards the north, and in the northern and western parts where it slopes towards the south and southeast respectively.

According to District Survey Report of Ananthapuram District by Department of Mines and Geology, Government of Andhra Pradesh, the district is roughly oblong in shape, the longer side running north to south with a portion of Chitradurga district of Karnataka State intruding into it from the west between Kundurpi and Amarapuram mandals. The district may be divided into 3 natural divisions. They are:

- i. Northern mandals of Rayadurg, Kanekal, Beluguppa Gooty, Guntakal, Vajrakarur, Uravakonda, Vidapanakal, Yadiki, Tadipatri (where the project site lies), Putlur and Yellanur containing larger areas of black cotton soils
- ii. Kalyandurg, Kambadur, Settur, Brahmamudram, Ramagiri, Kanaganapalli, C.K.Palli, Dharmavaram, Bathalapalli, Tadimarri, Mudigubba, Ananthapuram, Kudair, Pamidi and Peddavadugur in the centre which are mainly made up of arid treeless, expanse of poor red soils,
- iii. High level land of Penukonda, Roddam, Somandepalli, Hindupur, Lepakshi, Chilamathur, Madakasira, Rolla, Gudibanda and Agali which connects with Mysore plateau at higher elevation of the rest of the district. This part has average sandy red soils of normal productivity.

The **Figure 4:12** shows majority of the project area falls under a category which has an elevation of 233-256 m.

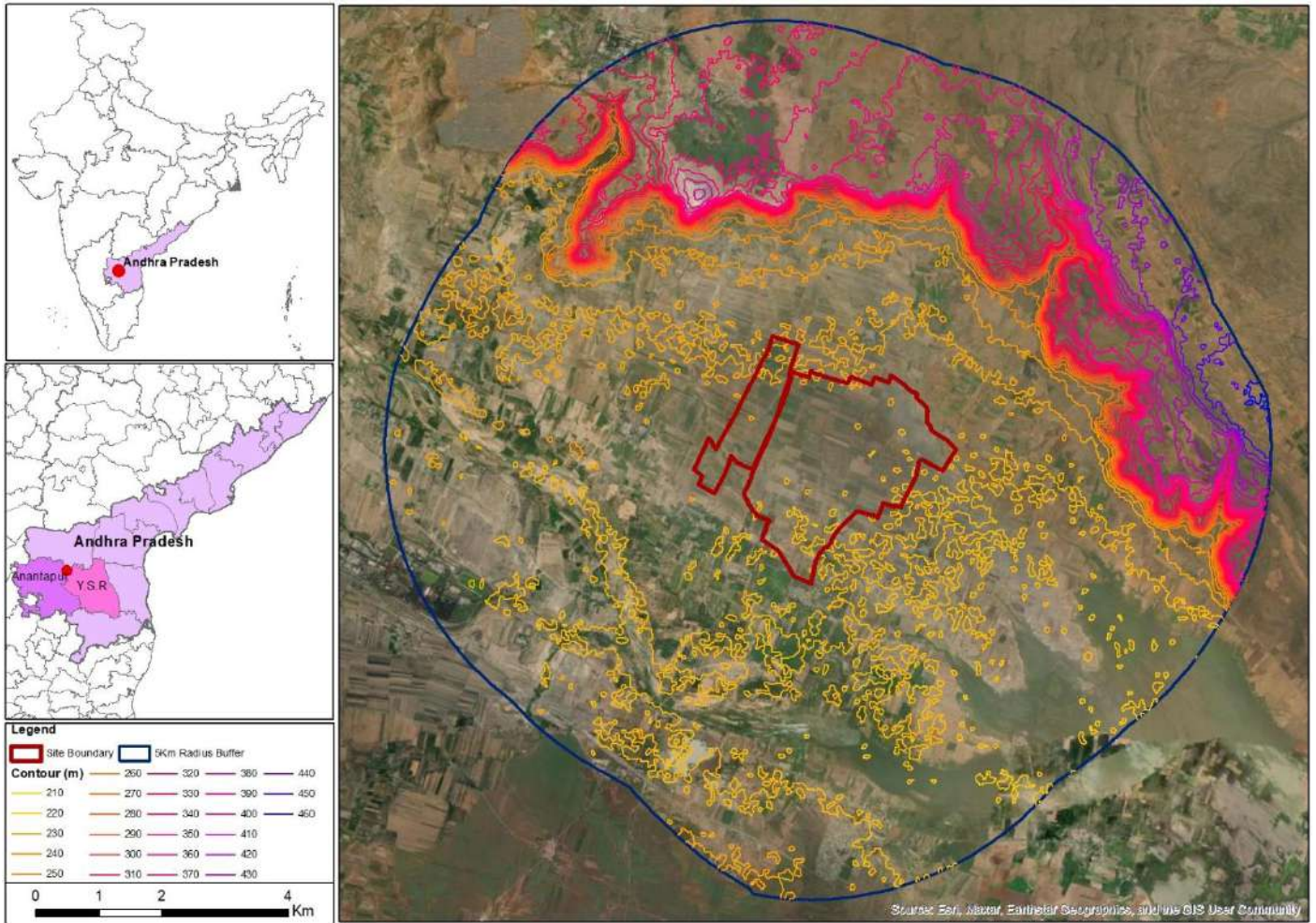
Figure 4:12 Map Showing Topography of the Project Study Area



Source: ArcGIS Mapping

The below contour map as shown in **Figure 4:13**, shows an contour intervals of 10 meters, with elevations reaching up to 240 meters within project boundary.

Figure 4:13 Map Showing Contour lines for the Project Study Area

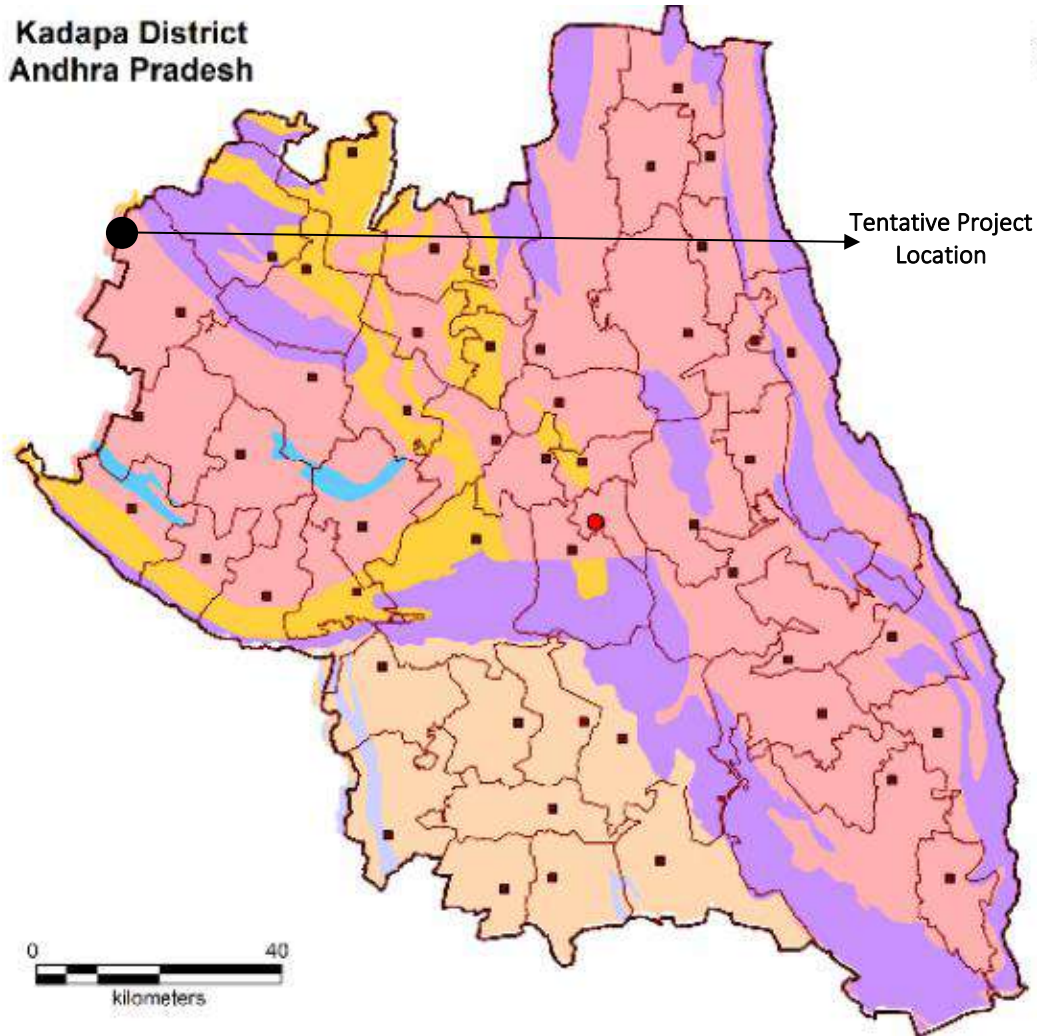


Source: ArcGIS Mapping

4.2.2.7 Geology and Hydrogeology

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, the geological composition comprises rocks from the Late Archaean or Early Proterozoic era overlain by formations from the Middle and Upper Proterozoic Age, including the Peninsular Gneissic Complex represented by granite, granodiorite, granite-gneiss, and migmatite. The metasedimentary rocks of the Cuddapah and Kurnool Group predominantly consist of shales, quartzites, limestones, and dolomites, with dolerite dykes intersecting the formations. The Geology map for YSR Kadapa District is shown in **Figure 4:14**.

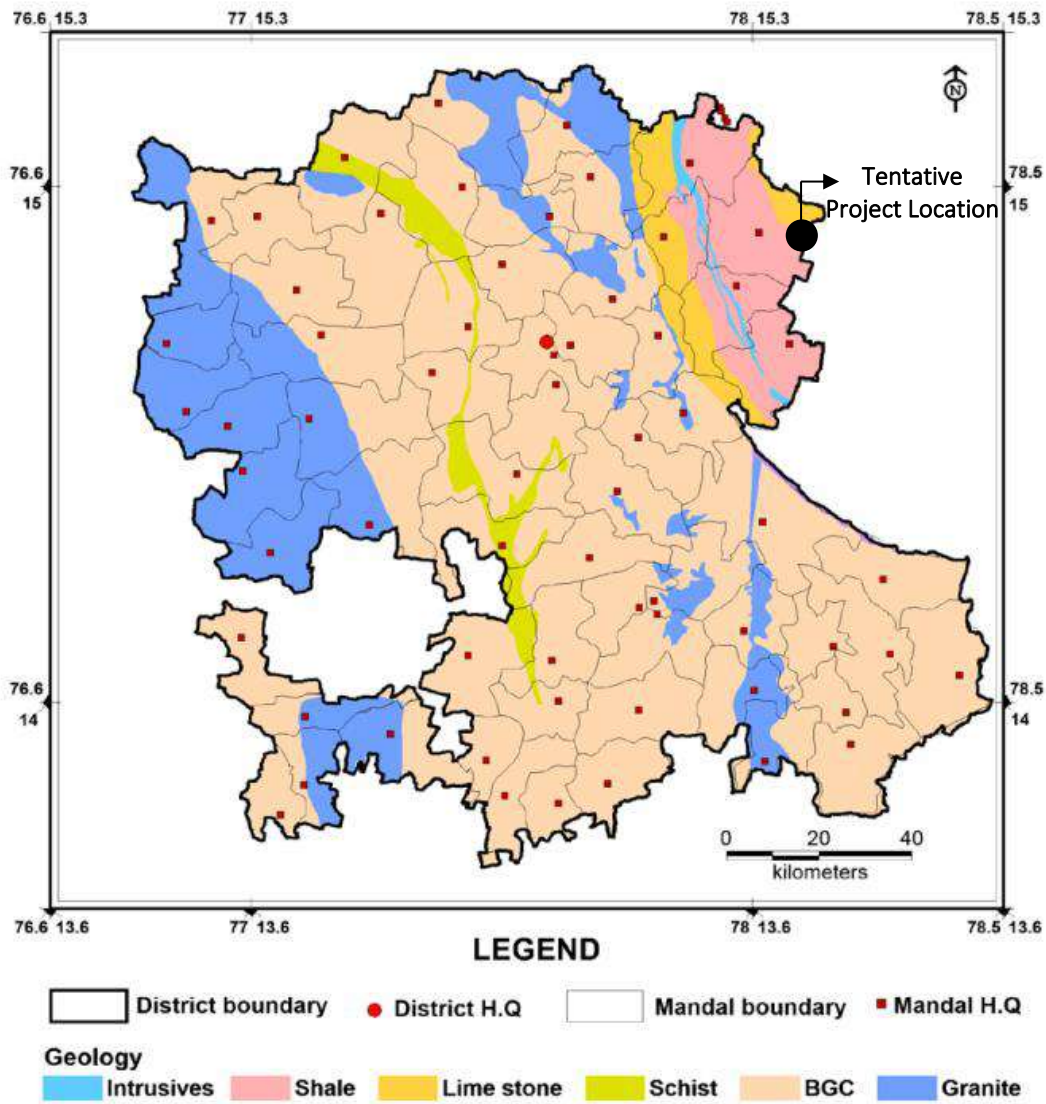
Figure 4:14 Geology map for YSR Kadapa District



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

Conversely, according to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, around 92% of the area is underlain by crystalline rocks, primarily the Banded Gneissic Complex and granites of Archaean to Proterozoic age, with a smaller portion (8%) in the northeastern parts comprising metasediments of the Cuddapah Supergroup, including shales and limestone. The Geology map of Ananthapuram District is shown in **Figure 4:15**.

Figure 4:15 Geology map for Ananthapuram District

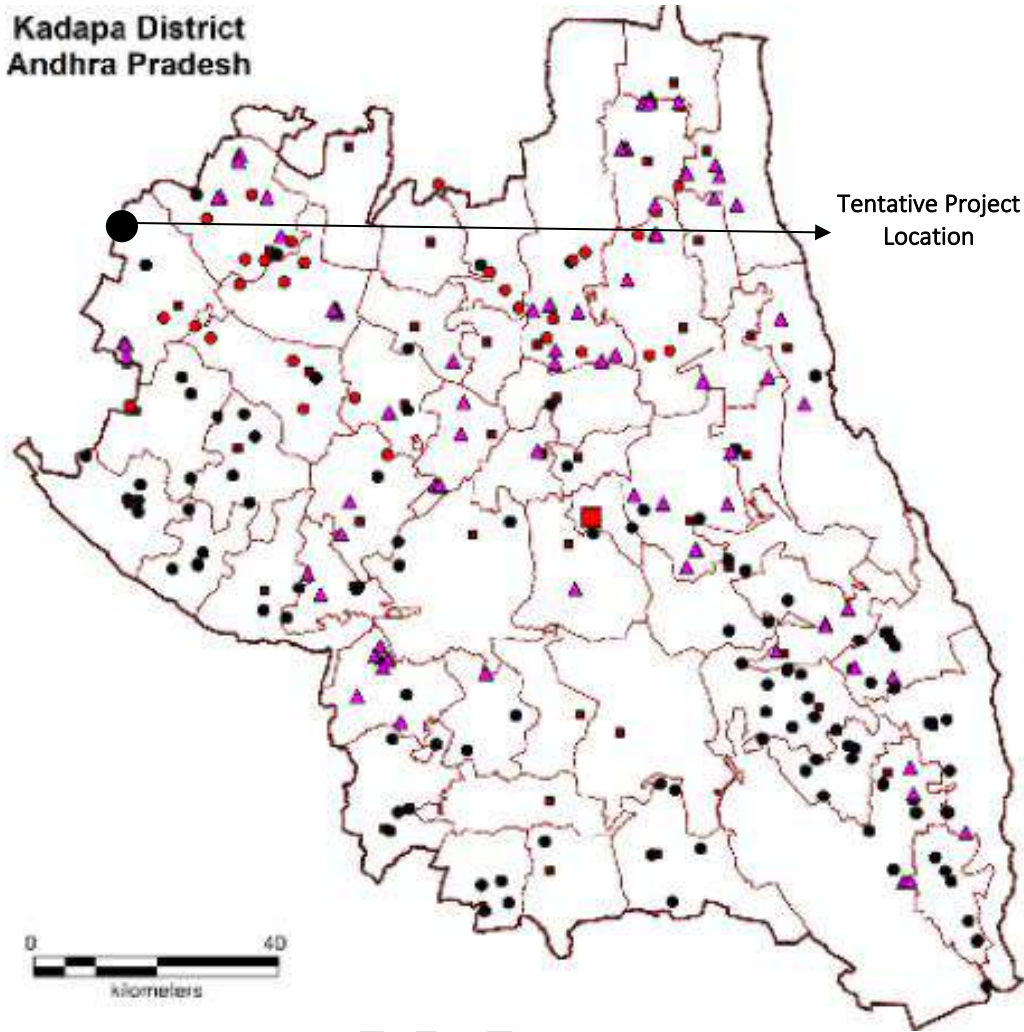


Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

Hydrogeology

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, the principal aquifers in the area comprise granites, gneisses, shales, limestone, and quartzites. Groundwater movement is influenced by the interconnection of secondary pores and voids resulting from fracturing and weathering. The Hydrogeology map of YSR Kadapa District is shown in **Figure 4:16**.

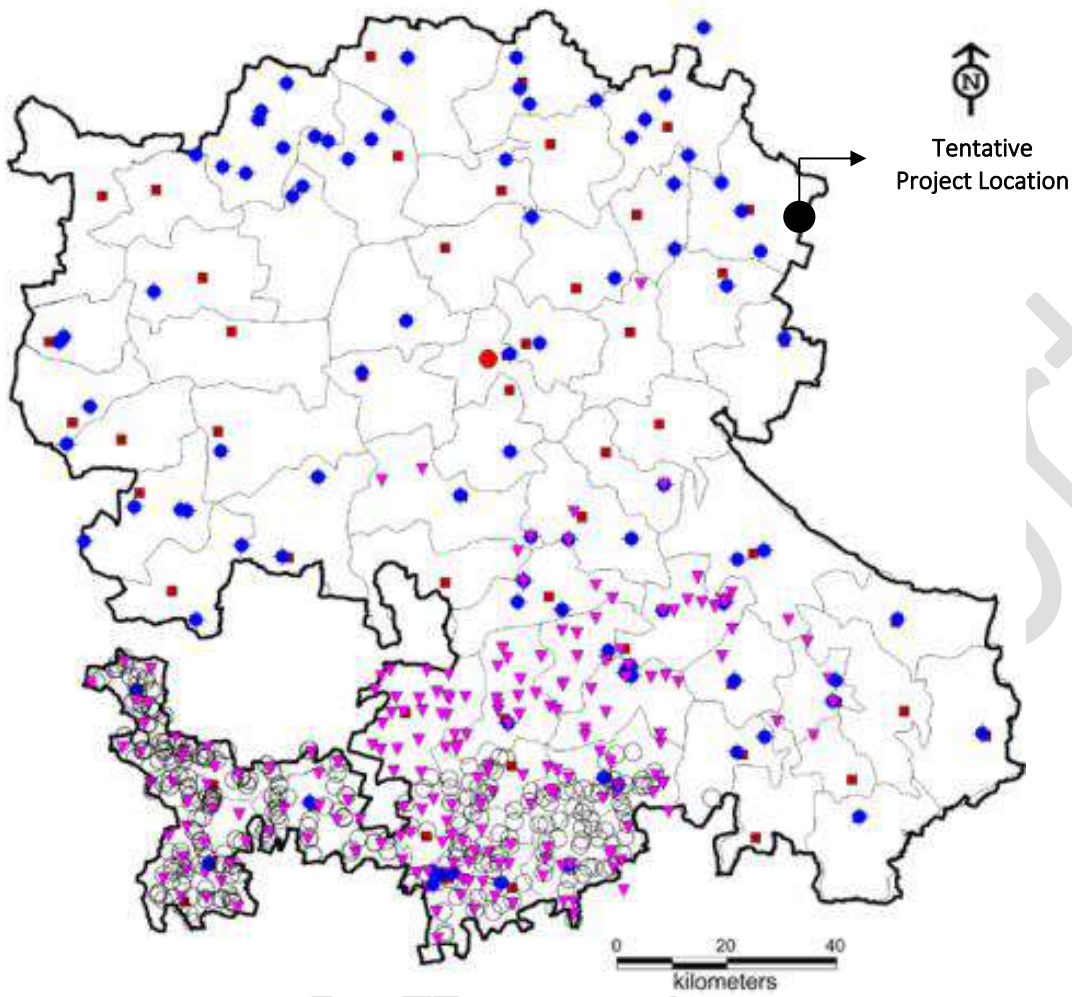
Figure 4:16 Hydrogeology map for YSR Kadapa District



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

Similarly, according to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, the occurrence and movement of groundwater are governed by geological frameworks, with granites and gneisses serving as the principal aquifers, and the degree of interconnection of secondary pores and voids determining groundwater flow patterns. According to the Central Ground Water Yearbook, Tadpatri Mandal, Anantapur District, Andhra Pradesh 2016, the area is underlain by Shales and Lime stones. Ground water occurs in weathered and fractured zones under water table and semi- confined conditions. Ground water occurs in the fractured rocks up to 200 m below ground level. The hydrogeology map of Ananthapuram District is shown in **Figure 4:17**.

Figure 4:17 Hydrogeology for Ananthapuram District

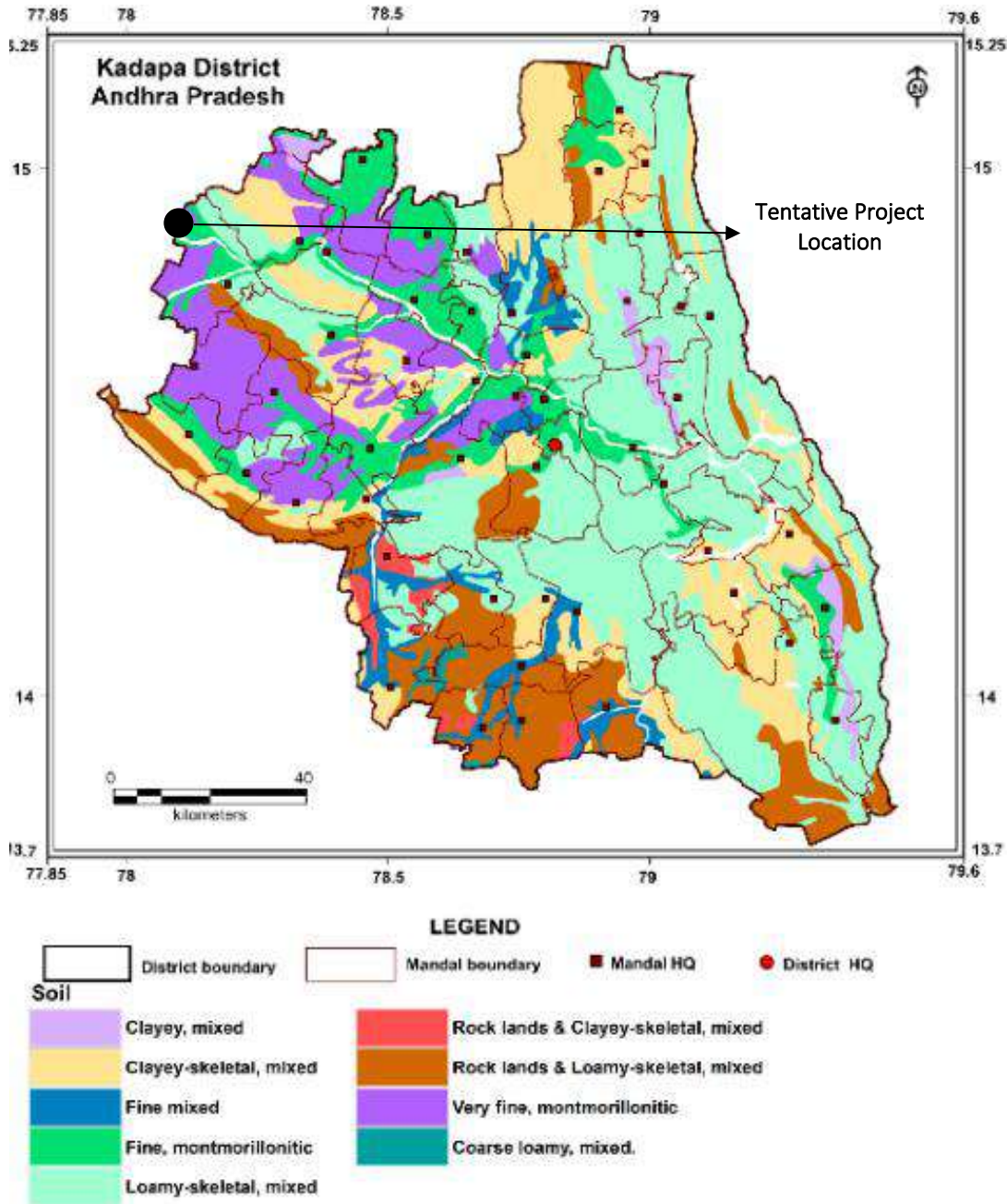


Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

4.2.2.8 Soil Type

According to the Ground Water Yearbook, YSR Kadapa District, the predominant soil types include loamy soils (53%), comprising red and sandy soils with shallow depth and low water holding capacity, and clayey soils (47%), characterized by deep, well-drained, gravelly clay with low available water content. Red loamy soils are prevalent in the eastern and southern parts, while clayey soils are mostly found in the northern (where the project site lies) and some southern areas, with mixed clayey to loamy soils observed in the central parts. The soil map of YSR Kadapa District is shown in **Figure 4:18**

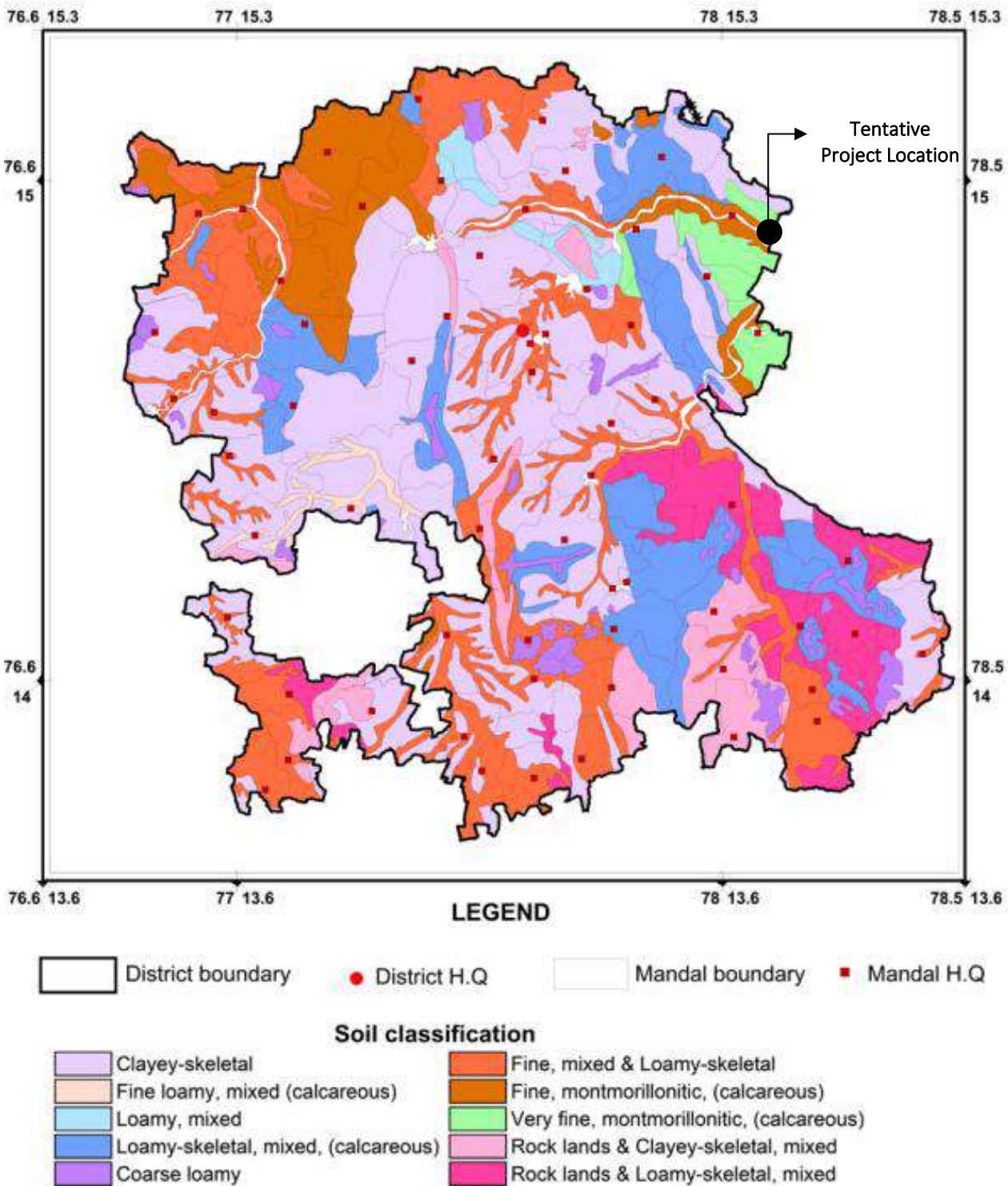
Figure 4:18 Soil map of YSR Kadapa district



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

According to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, the main soil types consist of clayey skeletal soils (36%), fine mixed loamy soils (23%), loamy soils (17%), fine montmorillonitic soils (10%), and rock outcrops (12%). The soil map of Ananthapuram District is shown in **Figure 4:19**.

Figure 4:19 Soil map of Ananthapuram district



Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

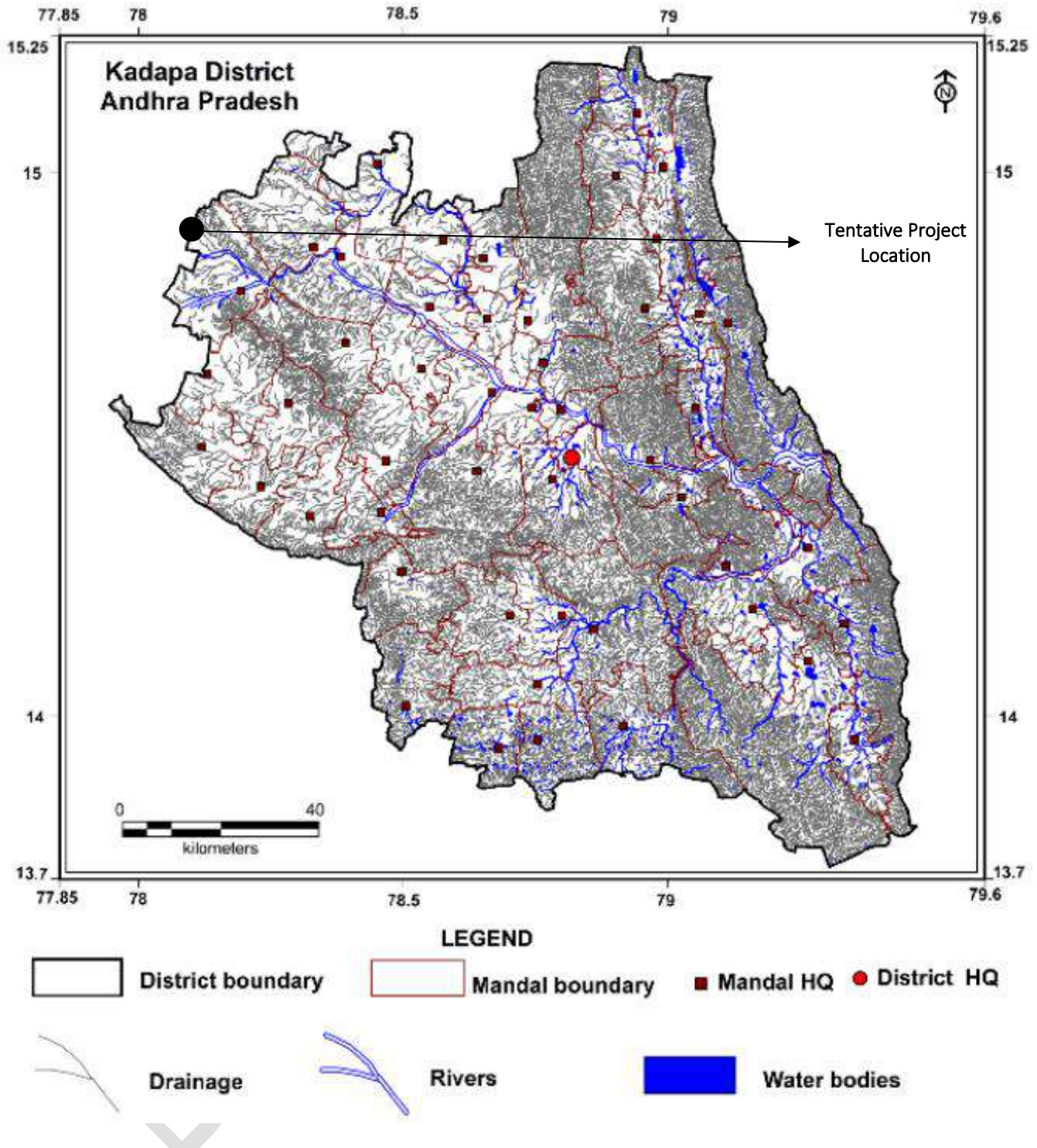
4.2.2.9 Water Resources

Drainage

According to the Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019, the Pennar River serves as the major stream flowing in a northwest to southeast direction, with key tributaries including Chitravathi, Cheyyair, Kundair, and Sagileru. The drainage pattern exhibits dendritic to sub-dendritic and parallel characteristics, with the Cuddapah basin representing a significant synformal structure containing minor antiforms and synforms. Numerous lineaments trend northeast-southwest, often parallel to geological formations, while others run in east-northeast to west-southwest or east-west directions. The drainage map of YSR Kadapa District is shown in **Figure 4:20**.

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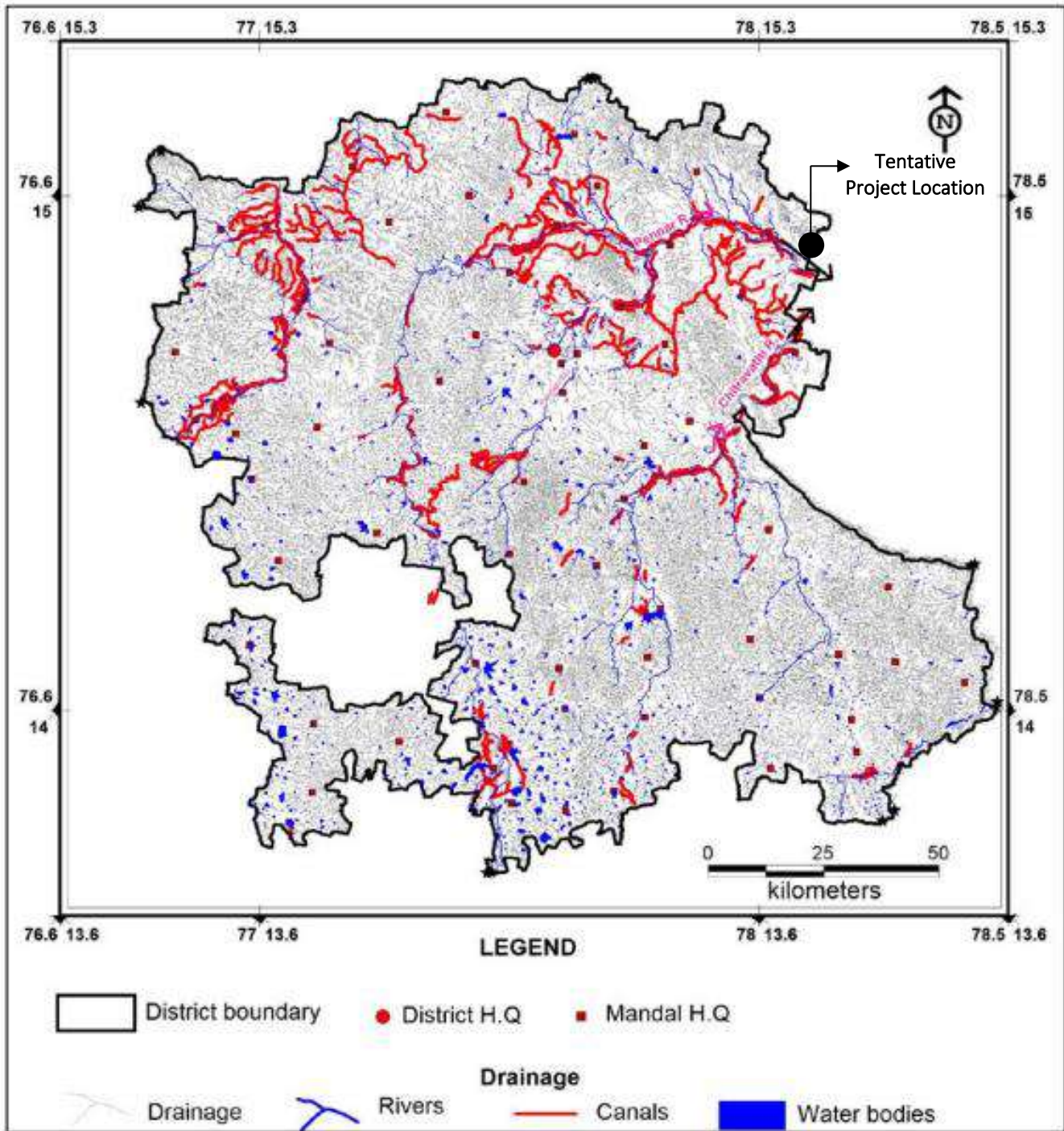
Figure 4:20 Drainage map of YSR Kadapa District



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

Conversely, according to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, the district is part of the Pennar and Krishna river basins, primarily drained by the rivers Pennar and its tributaries such as Jayamangala, Chitravathi, and Vedavathi, divided into 100 watersheds. The principal rivers flowing in the district are the Tungabhadra (and its tributary is Hundri). The Krishna and the Kunderu. According to the Central Ground Water Yearbook, Tadpatri Mandal, Anantapur District, Andhra Pradesh 2016, the area where the project lies is drained by streams which are tributaries of Pennar River. The streams are mostly ephemeral in nature. The drainage pattern is dendritic, rectangular to sub rectangular due to the influence of geological structures. The drainage map of Ananthapuram District is shown in **Figure 4:21**

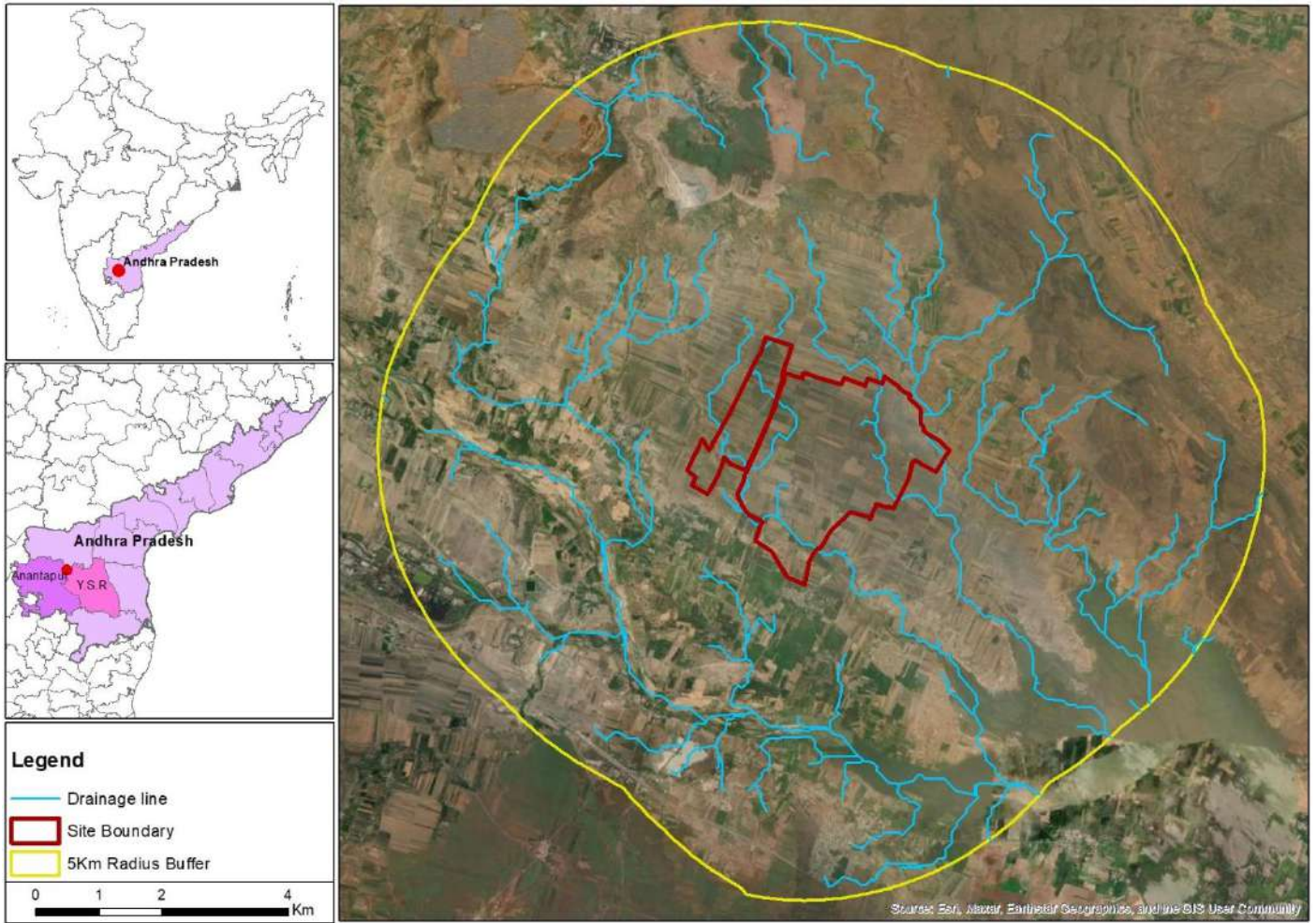
Figure 4:21 Drainage map of Ananthapuram District



Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

The drainage map of project study area is shown in **Figure 4:22**. There are dendritic to sub dendritic drainage channels passing through Project site as well as within the study area. Additionally, there are natural seasonal village ponds located within boundary. However, as per the project site team, the rainwater pond will not be disturbed in course of project implementation and also the water from the pond will not be used for project purpose.

Figure 4:22 Map showing Drainage Pattern of Project Study Area

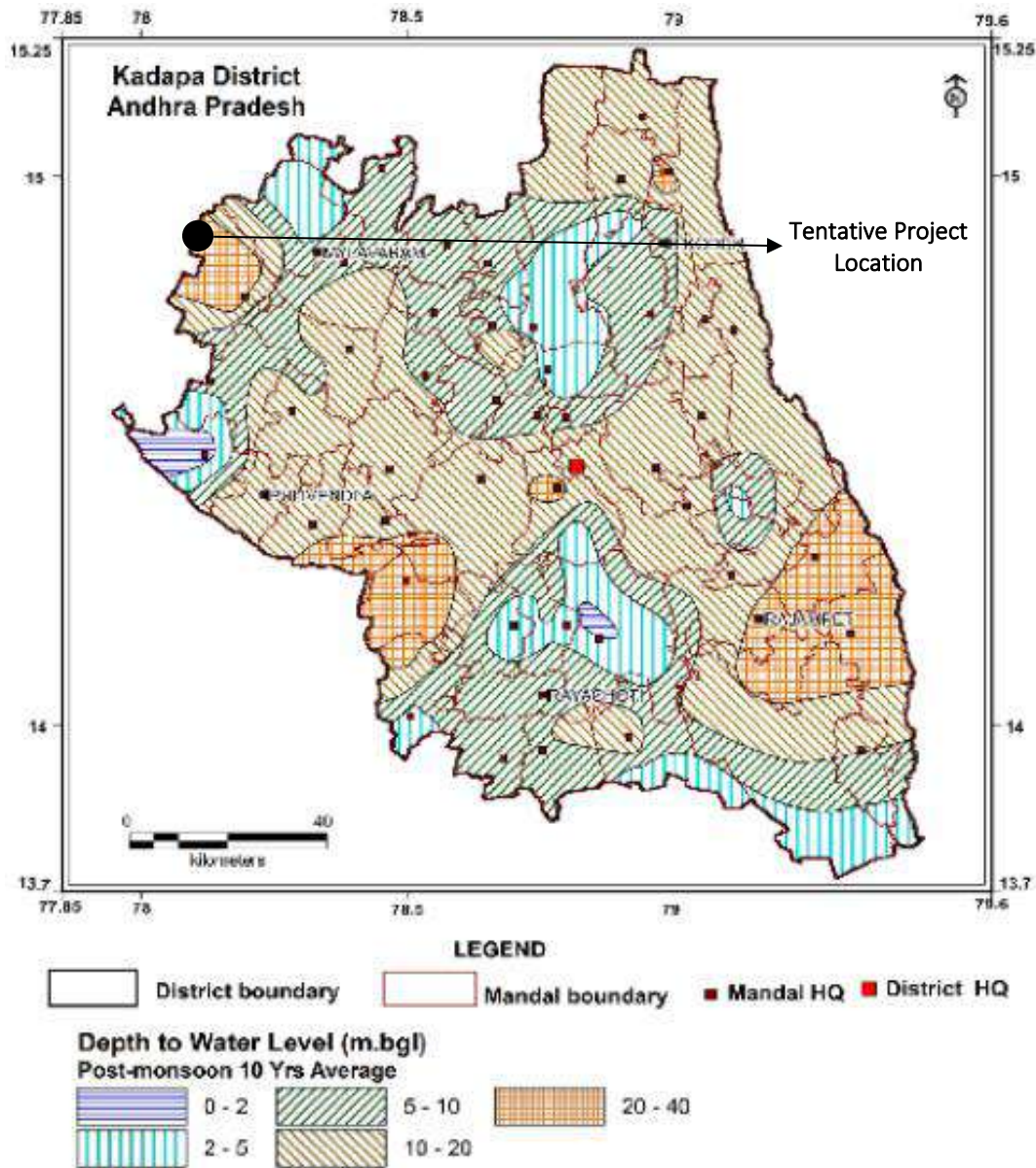


Source: ArcGIS Mapping

4.2.2.9.1 Groundwater Resources

According to the Ground Water Yearbook, YSR Kadapa District, the hydrogeological conditions indicate groundwater occurring under unconfined and semi-confined conditions, flowing from the weathered zone into the fractured zone, primarily comprising granites, shales, limestone, and quartzites. As per Department of Agriculture, Andhra Pradesh²², rain dependent tanks form the chief source of irrigation with seasonal rivers and rivulets and wells are the other sources of irrigation. Groundwater is accessed through shallow and deep bore wells, with average depth to water levels ranging from 4 to 47.22 meters below ground level during pre-monsoon and 1.4 to 33.34 meters during post-monsoon seasons. The majority of water levels during both seasons range from 10 to 20 meters, with deeper levels (>40 meters) occurring in specific areas. The Ground water level of YSR Kadapa District Pre Monsoon is shown in **Figure 4:23**

Figure 4:23 Ground water level in YSR Kadapa during Pre Monsoon



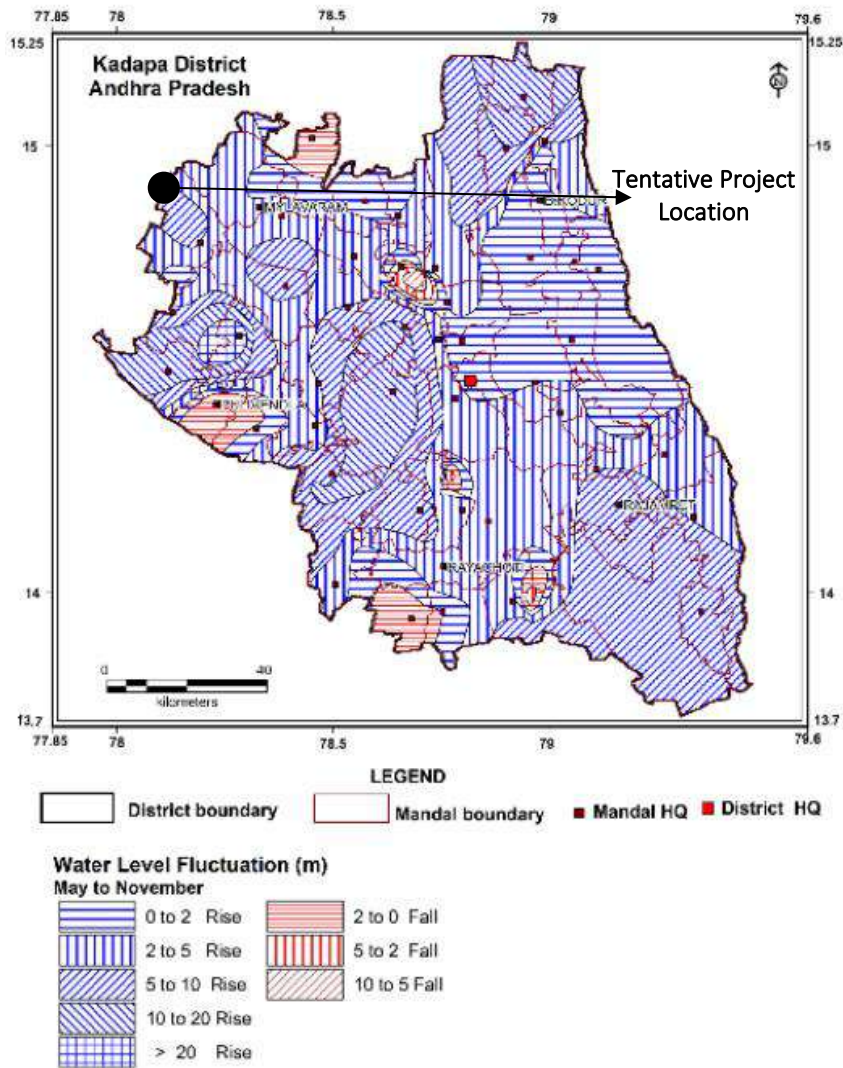
Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

The Ground water level of YSR Kadapa District Post Monsoon is shown in **Figure 4:24**.

²² Department of Agriculture, Andhra Pradesh: <https://kadapa.ap.gov.in/>

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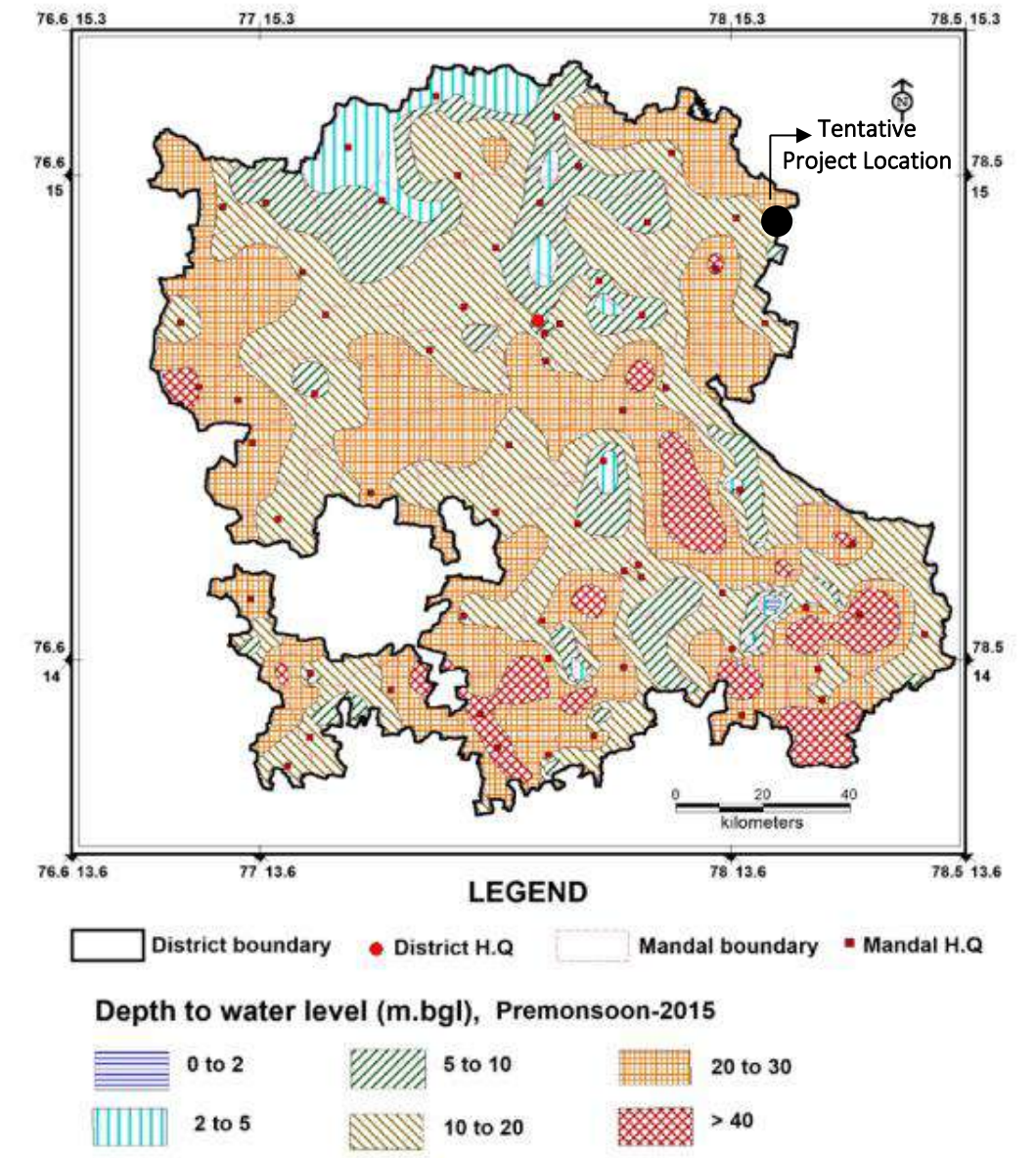
Figure 4:24 Ground water level in YSR Kadapa during Post Monsoon



Source: Ground Water Yearbook, YSR Kadapa District, Andhra Pradesh 2019

Conversely, according to the Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023, groundwater occurs under similar conditions, with the main aquifers consisting of the weathered and fractured zones extending to approximately 300 meters depth. Extraction primarily relies on boreholes with yields ranging from <0.2 to 7.43 liters/second. During the pre-monsoon season, water levels predominantly range from 10 to 20 meters, followed by 20 to 40 meters, with deeper levels (>40 meters) occurring in the southern and southeastern parts. Post-monsoon, water levels follow a similar pattern, with shallow levels (<5 meters) predominantly in the northern part of the district. According to the Central Ground Water Yearbook, Tadpatri Mandal, Anantapur District, Andhra Pradesh 2016, the depth to water level during the pre-monsoon and post-monsoon varies from 5 to 20 m. The average depth to water level (decadal) during pre and post monsoon is 10.8 and 5.8 m bgl respectively. The Ground water level of Ananthapuram District Pre Monsoon is shown in **Figure 4:25**

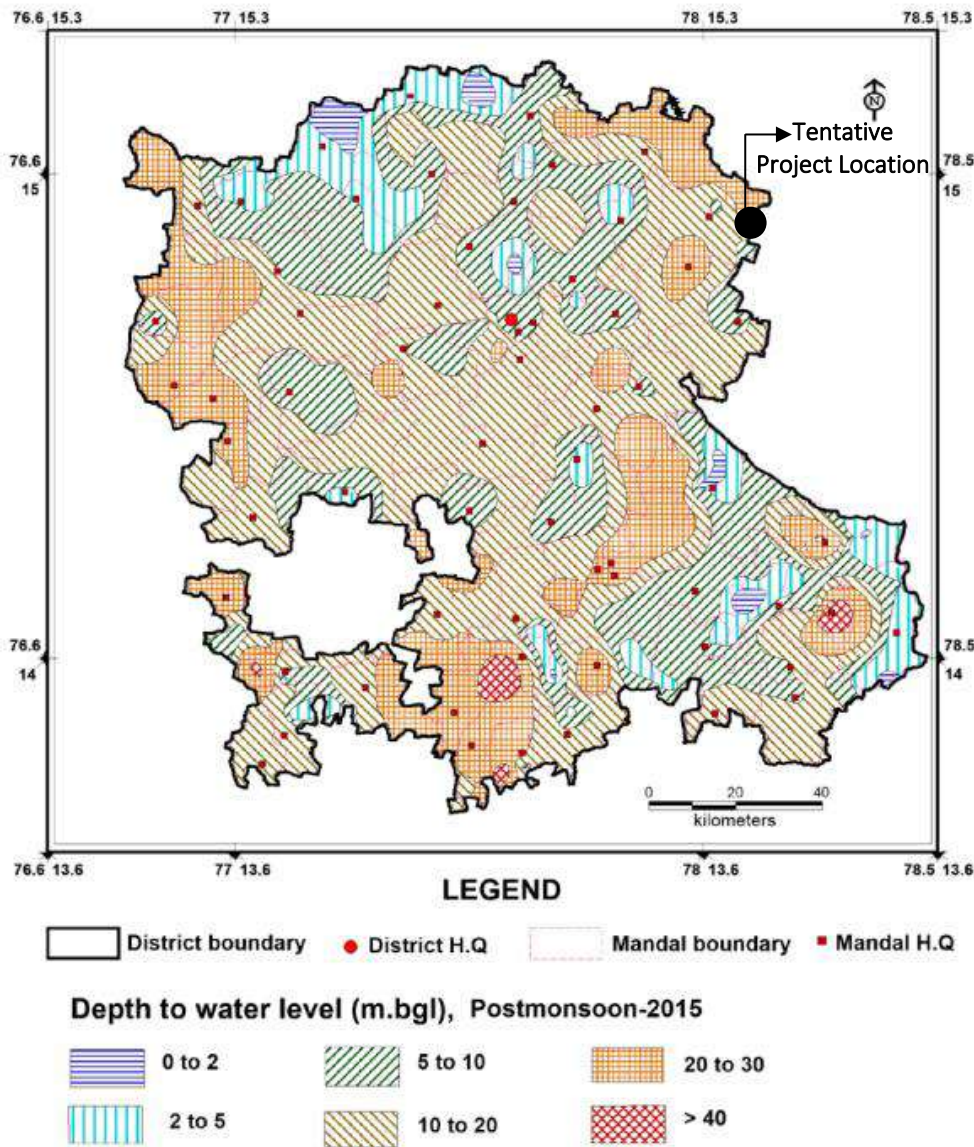
Figure 4:25 Ground water level in Ananthapuram District during Pre Monsoon



Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

The Ground water level of Ananthapuram District Post Monsoon is shown in *Figure 4:26*

Figure 4:26 Ground water level in Ananthapuram District during Post Monsoon



Source: Ground Water Yearbook, Ananthapuram District, Andhra Pradesh 2023

According to Dynamic ground water report 2023, both Tadpatri mandal, Ananthapuram district and Kondapuram mandal of YSR Kadapa district (where the project site falls) fall under the “Safe” category in terms of ground water extraction.

As compared to Dynamic Ground water resource assessment report 2022, the total Annual Ground Water Recharge for the State has increased from 27.23 bcm in 2022 to 27.83 bcm in 2023, which is attributed to excess rainfall, increase in surface water impoundments, government interventions, e.g. water conservation activities. Similarly, the annual extractable groundwater resources of the State increased from 25.86 bcm in 2022 to 26.45 bcm in 2023. The annual groundwater extraction has increased marginally from 7.45 in 2022 to 7.48 bcm in 2023 in the State. The stage of groundwater extraction of the state decreased marginally from 28.81% in 2022 to 28.3% in 2023 indicating overall improvement in ground water scenario.

As per the consultations done during the site visit, it is understood that primary source of water for drinking and domestic purpose in the study area is government supply water. As per Department of Agriculture, Andhra Pradesh²³, rain dependent Tanks form the chief source of irrigation with seasonal rivers and rivulets and Wells are the other sources of irrigation.

²³ Department of Agriculture, Andhra Pradesh: <https://kadapa.ap.gov.in/>

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4.2.2.10 Ambient Air

Based on the Air quality monitoring undertaken by CPCB under National Air Quality Monitoring Programme (NAMP), the nearest air quality monitoring location in YSR District is in RIMS, Putlampally, Kadapa, YSR District which is located approximately 43 km towards southeast direction from the project boundary. Nearest air quality monitoring location from the site in Ananthapuram district is in APIIC Zonal office, Industrial Estate which is located approximately 58 km towards southwest direction. The Annual Average air quality data of year 2023 for both the districts is shown in .

Table 4-13 Ambient Air Quality in YSR and Ananthapuram districts

Pollutants	YSR District Annual Average Concentration in $\mu\text{g}/\text{m}^3$	Ananthapuram districts Annual Average Concentration in $\mu\text{g}/\text{m}^3$
SO ₂	5.3	5.7
NO ₂	14.2	17.3
Particulate Matter 10	48	64
Particulate Matter 2.5	25	33

Source: National Air Quality Monitoring Programme

4.2.2.11 Noise Quality

Based on the Noise quality monitoring undertaken by Andhra Pradesh Pollution Control Board (APPCB) under National Air Quality Monitoring Programme (NAMP), the nearest noise quality monitoring location is in Ananthapuram District is ~56 km away in southwest direction at Pump House, Court Road. The nearest noise quality monitoring location in YSR Kadapa District is ~88 km away in southeast direction at Kadapa Municipal Corporation. The annual average noise quality data of both the districts is shown in .

Table 4-14 Ambient Noise Quality in YSR Kadapa and Ananthapuram districts

Sr.no	City/Town	Locations	Year 2022		Year 2023 (Upto January)	
			Day Avg dB(A)	Night Avg. dB(A)	Day Avg dB(A)	Night Avg. dB(A)
1	YSR Kadapa	Kadapa Municipal Corporation	59.2	53	60.9	52.8
2	Ananthapuram	Pump House, Court Road	69.8	59.9	68.2	57.9

Source: National Air Quality Monitoring Programme

4.2.2.12 Natural Hazards

Disaster Management, Relief & Civil Defense Department, Government of Andhra Pradesh, and Building Materials & Technology Promotion Council (BMTPC), Government of India, have published hazard maps of Andhra Pradesh. According to the District Disaster Management Plan, earthquake, floods, and wind are the main natural hazards that can cause damage to life and property, where the Project site falls²⁴. The Project level details with respect to natural hazards have been presented in below.

Earthquake: In Andhra Pradesh, the North Andhra districts extending to Nellore and along the area bordering Tirupati town in south direction (Chittoor district), fall under seismic Zone III, indicating a moderate risk of earthquakes. Earthquakes have been experienced in the south coastal region, the Godavari Valley, and the southern districts of Prakasam and Nellore. In November and December 2016, mild tremors were specifically felt in the rural areas of Nellore District. According to Vulnerability Atlas of India,

²⁴ <https://upsdma.up.nic.in/2023/SDMP-Plan-Part-1.pdf>

2019; the Project is located in an area that is designated as Zone III that corresponds to MSK VII. This is classified as a moderate damage risk zone in terms of earthquake occurrence, as indicated in the **Figure 4:27**.

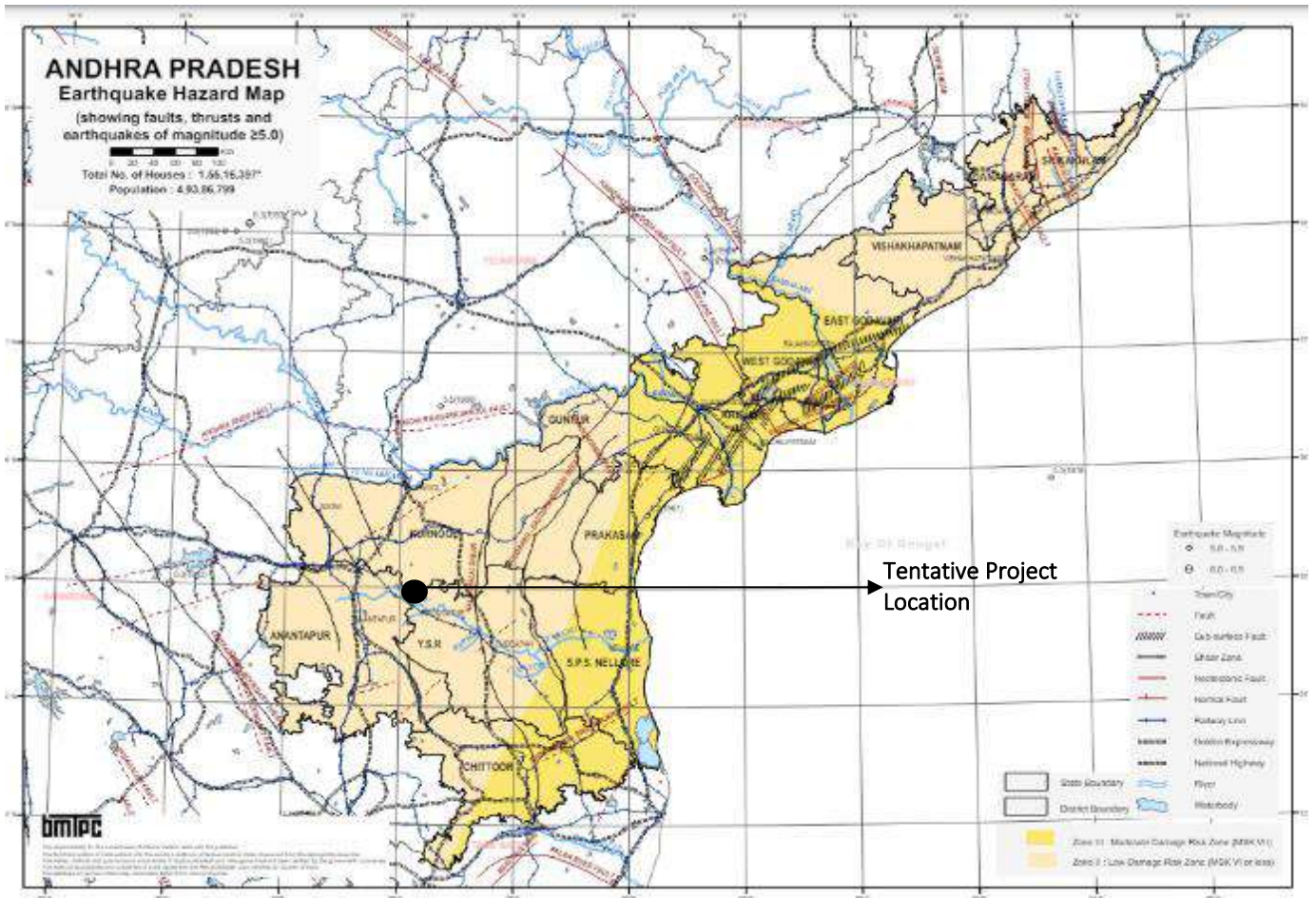
Wind/Cyclone: According to Andhra Pradesh State Disaster Management Plan 2017-18, approximately 44% of Andhra Pradesh is susceptible to tropical storms, particularly during the pre-monsoon (April-May) and post-monsoon (October-December) seasons. The state experienced two of the deadliest cyclones of the century in October 1971 and November 1977, each resulting in around 10,000 fatalities. Data from NRSC/ISRO indicates that Nellore is the most frequently affected district, followed by Krishna, East Godavari, and Srikakulam, with cyclones predominantly occurring in October and November. Notable cyclonic events include the May 1979 storm with extensive property damage, the devastating 1987 storms impacting 10 districts, the July 1989 cyclone causing 232 deaths, the severe May 1990 storm, and significant damage in November 1996. More recent cyclones include Laila in May 2010, Nilam in November 2012, Phailin, Helen, and PhaLeharilin in 2013, and Hudhud in October 2014, each resulting in substantial fatalities, property damage, and agricultural losses. According to Vulnerability Atlas of India, 2019; the Project site is located in an area that experiences moderate wind velocities $V_b = 39$ m/s and the zone is classified as Moderate Damage Risk Zone- B as presented in **Figure 4:28**.

Floods: According to Andhra Pradesh State Disaster Management Plan 2017-18, Andhra Pradesh is vulnerable to flooding due to its five major river systems: Godavari, Krishna, Penna, Vamsadhara, and Nagavali, particularly in the delta areas of these rivers. Historically, flooding was limited to smaller rivers and areas around Kolleru Lake, but worsening drainage problems in the coastal delta zones have increased flood hazards and the destructive potential of cyclones. Poor maintenance of irrigation systems exacerbates the situation, as seen in the May 1979 cyclone, where breaches in tanks and canals due to clogged drains caused significant flooding and deaths. Minor river basins also experience heavy flooding. Cities like Rajahmundry, Kakinada, Narsapur, Vijayawada, Guntur, Ongole, and Nellore, situated on flat alluvial plains, are particularly at risk. Additionally, drought-prone areas near coastal districts are susceptible to flash floods from torrential rains induced by cyclonic depressions. According to Vulnerability Atlas of India, 2019; the Project site falls in an area which under moderate damage risk zone (MSK VII) with respect to flooding incidents as indicated in the **Figure 4:29**.

Droughts: According to Andhra Pradesh State Disaster Management Plan 2017-18, drought is a major threat in Rayalaseema districts & Prakasham, but with change in weather pattern, many more interior areas of the Coastal belt are also experiencing drought in the recent past. Kurnool and Anantapur (where the project site lie) are part of Scarce rainfall Agro Climatic Zone. Drought was declared in 245 mandals of 7 districts, including Ananthapuram, Kurnool, Kadapa (where the project site lies), SPS Nellore, Prakasham and Srikakulam in 2016.

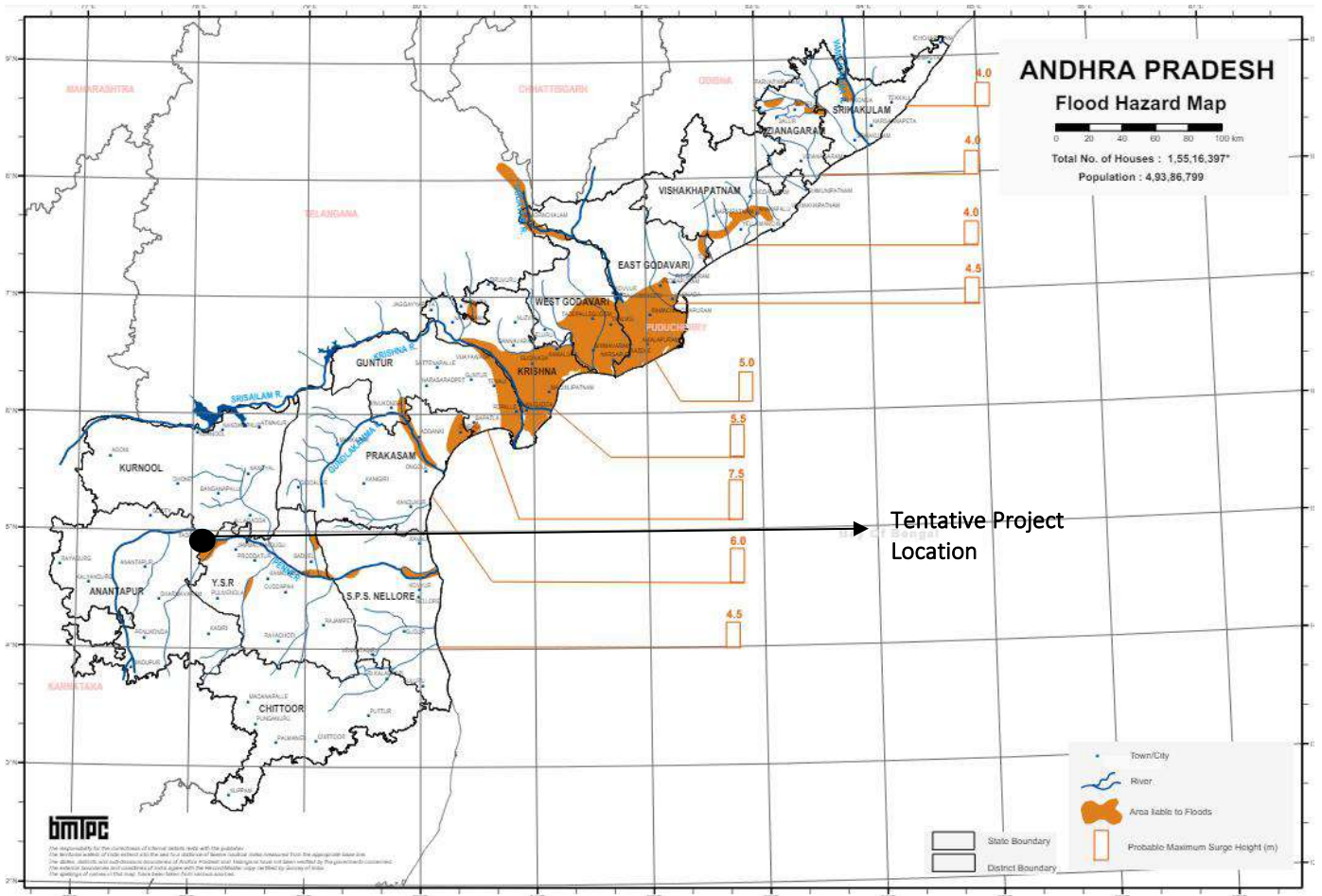
Heath Wave: According to Andhra Pradesh State Disaster Management Plan 2017-18, during the summer months, the maximum temperature often peaks to 45 degrees Celsius leading to severe head wave conditions. This results in loss of life of many people particularly the homeless, the elderly. Daily wage earners who work directly under the sun. Heatwave during the years 2014, 2015 and 2016 have caused major fatalities in Andhra Pradesh. Around 1745 people died to heatwave in 2015 and around 45 in 2016.

Figure 4:27 Map Showing Earthquake Hazard in Project District



Source: https://vai.bmtpc.org/map/eqmap/EQ_ANDHRA.pdf

Figure 4:29 Map Showing Flood Hazard in Project District



Source: <https://vai.bmtpc.org/map/floodmap/flood-andhra.pdf>

4.3 Socio-Economic Sensitivity and Baseline Conditions

4.3.1 Approach

E&S Advisors has adopted a participatory approach for establishing the social baseline for the project and undertaking the social impact assessment. Through this approach an attempt was made to integrate the local understanding and perspective into the impact assessment process and identification of the mitigation measures. The purpose of such an approach was to allow for:

- The triangulation of the information available from secondary sources through the information made available by the local community, both qualitative and quantitative
- Formulation of the socio-economic baseline based on a combination of primary and secondary qualitative and quantitative data.
- An understanding to be developed of the local community's perception of the project and its activities and the possible impacts from the same and the desirable mitigation measures.

4.3.2 Primary Data/ Information Collection/ Site Consultations

As part of the social baseline data collection process, consultations were undertaken with the local stakeholders identified for the Project. The provides a list of consultation undertaken as part of the site visit.

Table 4-15 Consultation Undertaken during the site visit

Sr. Stakeholder No. Details	Objective of the consultation	Remarks
1. Discussion with the Project site team	<p>Key Discussion points:</p> <ul style="list-style-type: none"> • Companies' policy towards land procurement & land Identification process. • Status and process of the land procurement • Avoidance measures adopted by the project at the time of land procurement to avoid negative impacts on the community and landowners • Timeline of the project • Key issues (if any) faced during the land procurement. • General perception of the local community about the project • Stakeholder engagement/ Grievance management 	<p>At this planning phase of the project, the project team has identified following key stakeholders for the Project:</p> <ul style="list-style-type: none"> • Land Lessors • Revenue department²⁵ • Nearby local community • Village council/ Panchayat
2. Project affected person	<ul style="list-style-type: none"> • To understand the process of land leasing and status of payment of compensation • Understand the project impact. • To assess the socio-economic conditions • To assess the community needs and perception about the project 	
3. Consultation with community	<p>Consultation on:</p> <ul style="list-style-type: none"> • Socio economic status of the village • Major occupation in the villages • Demographic Profile • Social stratification • Land use pattern • Literacy profile • Livelihood profile • Social and physical infrastructure • Social Issues • Feedback related to the proposed project 	

Source: Primary Survey

²⁵ It's a state government department in the local revenue authority who maintains the ownership record for specific area as well as to undertake the collection of land taxes

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As a part of these consultation an attempt has been made to develop an understanding of the stakeholder groups' key concerns and expectations from the project, the stakeholder groups' perception of the project and to triangulate the secondary information available on the area.

4.3.3 Review of Secondary Information

For establishing the social baseline for the study area, a review of the secondary information available in the public domain was undertaken. The list of secondary sources of information used is as follows:

- District Statistical Handbook
- Primary Census Abstract Data of India, 2011
- Village Directory Census Data of India, 2011
- AP Socioeconomic Caste Census 2011 & 2022-23
- National Crime Records Bureau Data 2022
- District Information System for Education (DISE)
- Swachh Bharat Mission (Grameen) 2.0 Report

4.3.4 Project Area for Socio-Economic Baseline

The study area for the socio-economic baseline encompasses of villages located within a 5 km radius of the Project site as well as the villages that the transmission line crossed through.

4.3.5 State Profile: Andhra Pradesh

Andhra Pradesh, located in south-eastern India, is bordered by Chhattisgarh to the north, Odisha to the northeast, Telangana and Karnataka to the west, Tamil Nadu to the south, and the Bay of Bengal to the east. With a coastline stretching along the Bay of Bengal, the state encompasses fertile river deltas, lush hills, and bustling cities. Telugu, the primary language spoken, reflects the vibrant cultural identity of the region, which is steeped in history and tradition. From the ancient temples of Tirupati to the bustling port city of Visakhapatnam, Andhra Pradesh offers a blend of historical landmarks, scenic landscapes, and modern urban centers. The state's economy thrives on agriculture, industry, and technology, making it a dynamic hub for commerce and innovation.

Andhra Pradesh is divided into 13 administrative divisions, which are further subdivided into 26 districts. These districts are further divided into sub-districts, also known as mandals or talukas. The number of sub-districts (mandals) in Andhra Pradesh is 670. Gram Panchayats are local self-government bodies at the village level, and Andhra Pradesh has thousands of Gram Panchayats spread across its rural areas. The total number of villages in Andhra Pradesh is approximately 29,000.

According to the Census of India 2011, Andhra Pradesh covers an area of 2,75,045 square kilometers, which is about 8% of India's total geographical area. The population of Andhra Pradesh is 8,45,80,777, which represents approximately 7% of India's total population. Out of this population, there are 4,24,42,146 males and 4,21,38,631 females, both constituting 7% of their respective genders nationwide. In Andhra Pradesh, there are total 2,10,22,588 households, accounting for around 9% of India's total households. Of these households 1,42,34,387 are in rural areas, making up about 8% of India's total rural households, while 67,88,201 are in urban areas, representing about 9% of India's total urban households. On average, there are 4 people per household in Andhra Pradesh, whereas there are 5 people per household in India. The population density in Andhra Pradesh is 308 persons per square kilometer, which is lower than the national average of 382 persons per square kilometer. The sex ratio in Andhra Pradesh is 993 females per 1000 males, compared to the national average sex ratio of 943 females per 1000 males according to the 2011 census. The literacy rate in Andhra Pradesh stands at 59.77%, lower than the national average of 74.04%. Among males, the literacy rate is 66.56%, which is also lower than the national male literacy rate of 82.14%, while among females, the literacy rate is 52.93%, also lower than the national female literacy rate of 65.46%.

In Andhra Pradesh, approximately 60% of the population is engaged in agriculture-related activities. The industrial and service sectors employ around 30% of the workforce, with the remaining percentage involved in other forms of employment. The state has a substantial informal sector, with around 86% of the workforce engaged in informal jobs, including agriculture and small businesses, while approximately 14% are employed in the formal sector. The cropping pattern in Andhra Pradesh is varied, with rice being cultivated on approximately 34% of the agricultural land. Cotton covers about 15% of the cropped area, groundnut accounts for around 13%, and sugarcane is grown on about 4% of the land. These crops are integral to the state's agriculture, with different regions specializing in different crops based on climatic and soil conditions. Major crops in Andhra Pradesh include rice, cotton, and groundnut. The state is a leading producer of these crops, with rice being a staple and cotton being crucial for the textile industry. Groundnut, an important oilseed crop, also plays a significant role in the state's agriculture. These crops support both local consumption and industrial needs. Irrigation in Andhra Pradesh primarily relies on rivers such as the Krishna, Godavari, and Penna, as well as reservoirs, tanks, and groundwater sources. About 40% of the agricultural land in the state is irrigated. Rainfall, which averages between 900 and 1,200 mm annually, is predominantly received during the monsoon season and varies significantly across

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different regions. Landholding sizes in Andhra Pradesh vary widely. Over 80% of farmers own less than 2 hectares of land, indicating a predominance of small and marginal farms. In contrast, around 5% of farmers have holdings exceeding 10 hectares, reflecting a small percentage of large-scale farming operations. Cattle rearing is a significant agricultural activity in Andhra Pradesh. The state has an estimated 9.5 million dairy cattle, contributing to a robust dairy sector. The total cattle population, including both dairy and draught animals, is around 14 million. This sector supports both milk production and agricultural activities. The major industries in Andhra Pradesh include information technology, textiles, pharmaceuticals, and food processing. The IT and software services sector contributes about 7% to the state's GDP. The pharmaceutical industry is significant, with over 200 companies operating in the state. Additionally, the textile industry is a major employer and economic contributor. Andhra Pradesh is rich in mineral resources. The state has an estimated 1.2 billion tonnes of coal reserves and significant limestone deposits used in cement production. Bauxite deposits, totaling approximately 400 million tonnes, and extensive granite reserves are also important. These minerals support various industrial activities and contribute to the state's economy.

According to the Andhra Pradesh Government website, the religious composition of Andhra Pradesh is diverse. Hinduism is the predominant religion, practiced by about 88% of the population. Islam is followed by roughly 9% of the population, while Christianity accounts for about 2%. Other religions make up less than 1% of the population, reflecting the state's multicultural and multi-religious society. Indigenous tribes in Andhra Pradesh include the Gonds, Chenchus, Konds, and Yanadis. The Gonds are one of the largest tribal communities, while the Chenchus primarily reside in the Nallamala Hills. The Konds are found in the Eastern Ghats, and the Yanadis live in the coastal regions, each community with distinct cultures and traditions. Cultural and historical sites in Andhra Pradesh include Amaravati, known for its ancient Buddhist stupa and ruins, and Hampi, a UNESCO World Heritage Site with Vijayanagara Empire ruins. Lepakshi is famous for its historic temples, and Bhadrachalam is known for its important Rama temple, making these sites significant for both cultural heritage and tourism.

4.3.6 District Profile: Ananthapuram

Ananthapuram District is situated in the southwestern part of Andhra Pradesh, India, and is part of the Rayalaseema region. It covers an area of approximately 19,130 square kilometers, making it one of the larger districts in the state. The district is bordered by Karnataka to the west and north, and by the Andhra Pradesh districts of Kadapa to the east and Kurnool to the northeast. Its location results in a relatively arid climate compared to other parts of Andhra Pradesh. As of the latest census data, Ananthapuram District has a population of around 2.6 million people, with a population density of approximately 136 people per square kilometer. The sex ratio is about 992 females per 1,000 males, reflecting a relatively balanced demographic distribution. The literacy rate in the district stands at around 64.7%, indicating ongoing efforts to improve educational access and infrastructure.

Landholdings in Ananthapuram District vary, with about 70% of farmers owning less than 2 hectares of land. A smaller percentage of farmers manage larger holdings. Cattle rearing is an important activity, supporting both agriculture and dairy production. The district has a substantial cattle population, which aids in milk production and provides draught power. Agriculture is the primary occupation in Ananthapuram District, with a significant portion of the population engaged in farming and related activities. Approximately 60% of the workforce is involved in agriculture, while the remainder works in various sectors, including small-scale trade, services, and casual labor. The district's workforce predominantly relies on agriculture due to the area's extensive rural character. Major industries in Ananthapuram District include textiles, agriculture-based industries, and small-scale manufacturing. The district hosts several textile units and engages in the processing of agricultural products such as oilseeds. It is known for its mineral resources, including granite and limestone, which are used in construction and various industrial applications. The cropping pattern is influenced by the district's arid climate, with major crops including groundnut, cotton, and red gram (pulses). These crops are suited to the local conditions and contribute significantly to the local economy. The district manufactures a range of products, including textiles, agricultural products, and processed food items. Textile production is particularly notable, with local industries involved in fabric and garment manufacturing. Indigenous tribes in the district include the Chenchus and the Koyas, who live in more remote areas and have distinct cultural practices and traditions.

The religious composition of the district is predominantly Hindu, with about 85% of the population adhering to Hinduism. Islam is practiced by around 12% of the people, while Christianity and other religions account for the remaining percentage. Notable cultural and historical sites in Ananthapuram District include the ancient temples in Penukonda, which reflect the district's rich historical and architectural heritage. The district also features other historical sites, including ancient forts and temples, contributing to its cultural significance.

4.3.7 District Profile: Y.S.R

Y.S.R. District, officially known as Y. S. Reddy District, is located in the southern part of Andhra Pradesh, India. It is a part of the Rayalaseema region and covers an area of approximately 15,379 square kilometers. The district is bordered by Kadapa District to the north, Chittoor District to the east, and the Karnataka state to the west. To the south, it shares a border with the Tamil Nadu state. As of the most recent census, Y.S.R. District has a population of approximately 2.7 million people, with a population density of around 176 people per square kilometer. The district has a sex ratio of about 992 females per 1,000 males. The literacy rate in

Y.S.R. District is approximately 66.5%, reflecting ongoing improvements in educational infrastructure and access. The primary occupation in Y.S.R. District is agriculture, with a significant portion of the population engaged in farming and related activities. Around 58% of the workforce is involved in agriculture, while the rest are employed in various other sectors, including small-scale trade, services, and casual labor. Agriculture remains a crucial part of the district's economy due to its rural character.

The cropping pattern in Y.S.R. District is influenced by its climatic conditions. Major crops include groundnut, cotton, red gram, and sunflower. The district's agriculture relies on both rain-fed and irrigated methods to support these crops, with irrigation facilities playing a crucial role in farming. Landholdings in Y.S.R. District vary widely. A significant portion of farmers, around 70%, own less than 2 hectares of land. Larger landholdings are less common, with a smaller percentage of farmers managing more extensive areas. Cattle rearing is an important activity in the district, with many farmers keeping cattle for dairy production and draught power. The district supports a notable cattle population, contributing to both agriculture and dairy industries. Major industries in Y.S.R. District include agriculture-based industries, textiles, and small-scale manufacturing. The district has several textile units and engages in the processing of agricultural products. It is known for its production of groundnut and cotton, which are significant to its industrial base. The district is rich in mineral resources, including limestone, granite, and bauxite. These minerals are used in construction and various industrial applications. Y.S.R. District's mining activities support the local economy and provide raw materials for different industries. Y.S.R. District manufactures a variety of products, including textiles, agricultural goods, and processed food items. The textile industry is particularly prominent, with several local businesses involved in fabric production and garment manufacturing.

The religious composition of Y.S.R. District is predominantly Hindu, with approximately 85% of the population practicing Hinduism. Islam is followed by about 12% of the population, while Christianity and other religions account for the remaining percentage. The district reflects a diverse religious landscape typical of Andhra Pradesh. Indigenous tribes and tribal communities in Y.S.R. District include the Chenchus and the Yanadis. These communities reside in the more remote and forested areas of the district and maintain distinct cultural traditions and practices. Notable cultural and historical sites in Y.S.R. District include the ancient temples in the towns of Yerraguntla and Proddatur, which reflect the district's rich historical and architectural heritage. Additionally, the district has various other historical sites and cultural landmarks that contribute to its cultural significance.

4.3.8 District Profile: Kurnool

Y.S.R. District, officially known as Y. S. Reddy District, is located in the southern part of Andhra Pradesh, India. It is a part of the Rayalaseema region and covers an area of approximately 15,379 square kilometers. The district is bordered by Kadapa District to the north, Chittoor District to the east, and the Karnataka state to the west. To the south, it shares a border with the Tamil Nadu state. As of the most recent census, Y.S.R. District has a population of approximately 2.7 million people, with a population density of around 176 people per square kilometer. The district has a sex ratio of about 992 females per 1,000 males. The literacy rate in Y.S.R. District is approximately 66.5%, reflecting ongoing improvements in educational infrastructure and access. The primary occupation in Y.S.R. District is agriculture, with a significant portion of the population engaged in farming and related activities. Around 58% of the workforce is involved in agriculture, while the rest are employed in various other sectors, including small-scale trade, services, and casual labor. Agriculture remains a crucial part of the district's economy due to its rural character.

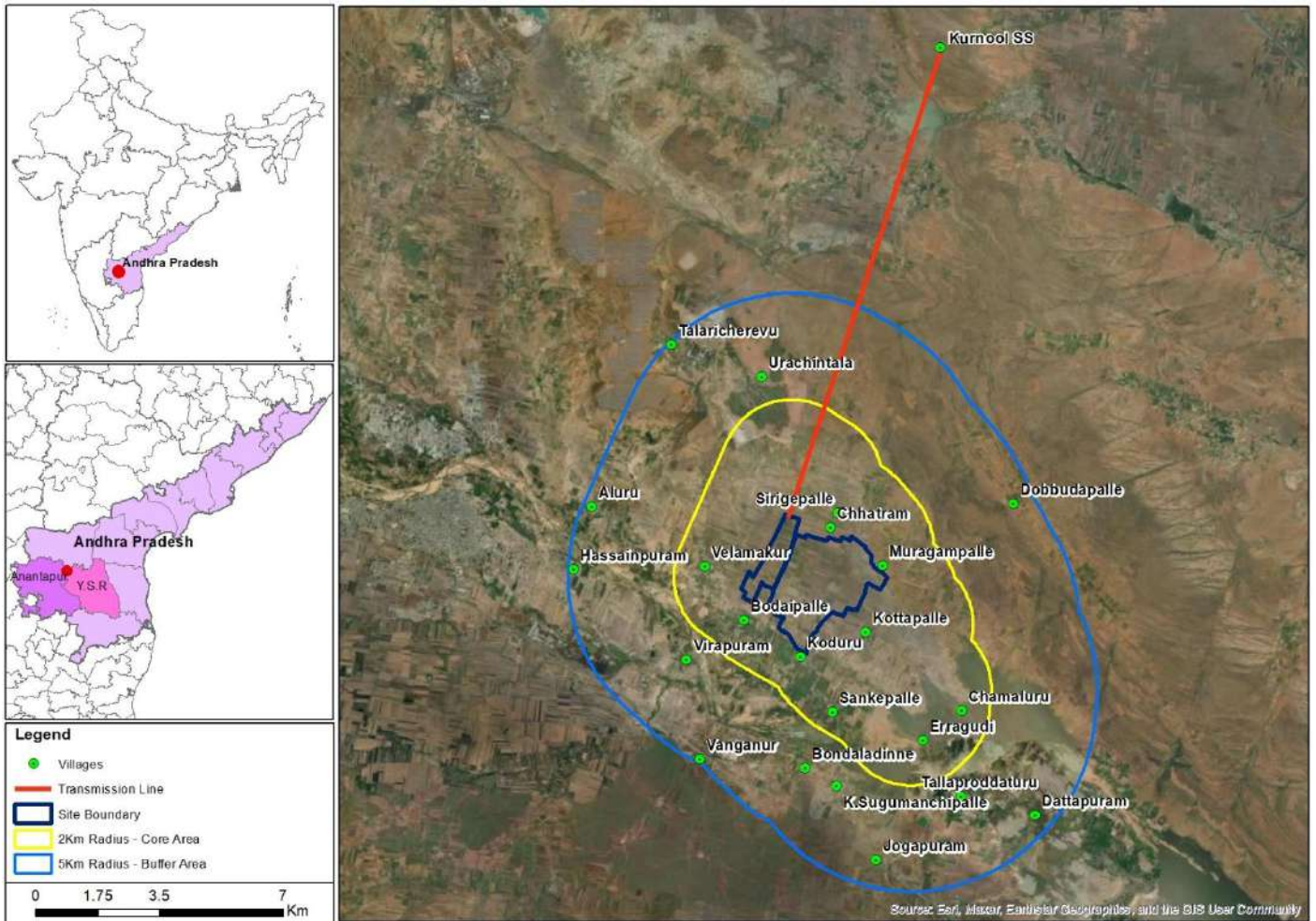
The cropping pattern in Y.S.R. District is influenced by its climatic conditions. Major crops include groundnut, cotton, red gram, and sunflower. The district's agriculture relies on both rain-fed and irrigated methods to support these crops, with irrigation facilities playing a crucial role in farming. Landholdings in Y.S.R. District vary widely. A significant portion of farmers, around 70%, own less than 2 hectares of land. Larger landholdings are less common, with a smaller percentage of farmers managing more extensive areas. Cattle rearing is an important activity in the district, with many farmers keeping cattle for dairy production and draught power. The district supports a notable cattle population, contributing to both agriculture and dairy industries. Major industries in Y.S.R. District include agriculture-based industries, textiles, and small-scale manufacturing. The district has several textile units and engages in the processing of agricultural products. It is known for its production of groundnut and cotton, which are significant to its industrial base. The district is rich in mineral resources, including limestone, granite, and bauxite. These minerals are used in construction and various industrial applications. Y.S.R. District's mining activities support the local economy and provide raw materials for different industries. Y.S.R. District manufactures a variety of products, including textiles, agricultural goods, and processed food items. The textile industry is particularly prominent, with several local businesses involved in fabric production and garment manufacturing.

The religious composition of Y.S.R. District is predominantly Hindu, with approximately 85% of the population practicing Hinduism. Islam is followed by about 12% of the population, while Christianity and other religions account for the remaining percentage. The district reflects a diverse religious landscape typical of Andhra Pradesh. Indigenous tribes and tribal communities in Y.S.R. District include the Chenchus and the Yanadis. These communities reside in the more remote and forested areas of the district and maintain distinct cultural traditions and practices. Notable cultural and historical sites in Y.S.R. District include the ancient temples in the towns of Yerraguntla and Proddatur, which reflect the district's rich historical and architectural heritage. Additionally, the district has various other historical sites and cultural landmarks that contribute to its cultural significance.

4.3.9 Profile of the Study Area

Figure 4:30 depicts the study area, which encompasses the villages located within a 5 km radius of the project site, along with the transmission line route.

Figure 4:30 Villages falling under the Study Area



Source: Google Imagery

The villages falling within the study area are listed below –

Table 4-16 Villages in the Study Area

District Name	Tehsil Name	Village Name
Project Villages		
Y.S.R.	Kondapuram	Koduru
Anantapur	Tadpatri	Bodaipalle
Core Villages (2 km)		
Anantapur	Tadpatri	Velamakur
Y.S.R.	Kondapuram	Chamaluru
Kurnool	Kolimigundla	Erragudi
Y.S.R.	Jammalamadugu	Sirigepalle
Y.S.R.	Jammalamadugu	Sankepalle
Y.S.R.	Jammalamadugu	Kottapalle

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District Name	Tehsil Name	Village Name
Y.S.R.	Jammalamadugu	Muragampalle
Y.S.R.	Jammalamadugu	Chhatram
Buffer Villages (5 km)		
Anantapur	Tadpatri	Talaricheruvu
Anantapur	Tadpatri	Vanganur
Anantapur	Tadpatri	Bondaladinne
Y.S.R.	Kondapuram	K.Sugumanchipalle
Y.S.R.	Kondapuram	Jogapuram
Y.S.R.	Kondapuram	Tallaprodaturu
Y.S.R.	Kondapuram	Dobbudapalle
Y.S.R.	Kondapuram	Dattapuram
Anantapur	Tadpatri	Aluru
Anantapur	Tadpatri	Hassainpuram
Anantapur	Tadpatri	Virapuram
Anantapur	Tadpatri	Urachintala
Transmission Line Villages		
Y.S.R.	Kondapuram	K Sirige Palle
Kurnool	Koilkuntla	Ummaipalle
Kurnool	Koilkuntla	Thollamadugu
Kurnool	Koilkuntla	Shotrium Chennampalle
Kurnool	Koilkuntla	Nandipadu
Kurnool	Koilkuntla	Thimmanayunipeta

Source: Google Imagery

4.3.9.1 Demographic Profile

The table presents demographic and household data from various villages across Y.S.R., Anantapur, and Kurnool districts. Each district's data is categorized into Project Villages, Core Villages, Buffer Villages, and Transmission Line Villages, revealing a range of population sizes and demographic characteristics.

In Y.S.R. District, Project Villages like Koduru exhibit a substantial population of 2,808 people with a nearly balanced sex ratio of 982 females per 1,000 males and a child sex ratio of 994, indicating a stable demographic profile. Similarly, Chamaluru has a smaller population of 930, with a lower sex ratio of 902. However, several Core Villages, including Sankepalle and Kottapalle, have missing data, which limits the ability to assess their demographics accurately. Buffer Villages such as K.Sugumanchipalle and Jogapuram show varied sex ratios, with Jogapuram having a notably high sex ratio of 1,097 and a low child sex ratio of 667, suggesting potential demographic imbalances.

In Anantapur District, the Project Village of Bodaipalle has a population of 1,300 with a sex ratio of 1,009 and a child sex ratio of 1,155, indicating a favorable demographic situation for females. Conversely, in the Buffer Village of Talaricheruvu, which has a population of 1,483, the child sex ratio is relatively low at 800, which may point to issues related to gender disparities or child health.

Kurnool District's Erragudi, a Project Village, has a population of 1,191, a sex ratio of 985, and an exceptionally high child sex ratio of 1,205, suggesting a higher proportion of female children compared to other villages. The data for several Transmission Line Villages, such as Ummaipalle and Nandipadu, are missing, which obscures a complete understanding of their demographic profiles and the potential impacts of infrastructure projects on these communities.

Overall, the data highlights significant variability in population size, sex ratios, and child sex ratios across the villages. The missing data in several villages suggests the need for improved data collection to address demographic and development challenges more effectively.

The socio-economic profile of the villages, as gleaned from the provided data, reveals a diverse landscape with varying characteristics. Here is a comprehensive analysis of the villages within the study area:

Sr. No.	District	Tehsil	Project Villages	Households	Population	Males	Females	Sex Ratio	Child Sex Ratio
Project Villages									
1	Y.S.R.	Kondapuram	Koduru	696	2808	1417	1391	982	994
2	Anantapur	Tadpatri	Bodaipalle	317	1300	647	653	1009	1155
Core Villages									
3	Anantapur	Tadpatri	Velamakur						
4	Y.S.R.	Kondapuram	Chamaluru	244	930	489	441	902	842
5	Kurnool	Kolimigundla	Erragudi	300	1191	600	591	985	1205
6	Y.S.R.	Jammalamadugu	Sirigepalle	236	929	473	456	964	914
7	Y.S.R.	Jammalamadugu	Sankepalle	N/A	N/A	N/A	N/A	N/A	N/A
8	Y.S.R.	Jammalamadugu	Kottapalle	N/A	N/A	N/A	N/A	N/A	N/A
9	Y.S.R.	Jammalamadugu	Muragampalle	N/A	N/A	N/A	N/A	N/A	N/A
10	Y.S.R.	Jammalamadugu	Chhatram	N/A	N/A	N/A	N/A	N/A	N/A
Buffer Villages									
11	Anantapur	Tadpatri	Talaricheruvu	387	1483	767	716	934	800
12	Anantapur	Tadpatri	Vanganur	176	590	293	297	1014	889
13	Anantapur	Tadpatri	Bondaladinne	269	1115	572	543	949	688
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	297	1172	588	584	993	1048
15	Y.S.R.	Kondapuram	Jogapuram	17	65	31	34	1097	667
16	Y.S.R.	Kondapuram	Tallaprodudduru	N/A	N/A	N/A	N/A	N/A	N/A
17	Y.S.R.	Kondapuram	Dobbudapalle	N/A	N/A	N/A	N/A	N/A	N/A
18	Y.S.R.	Kondapuram	Dattapuram	N/A	N/A	N/A	N/A	N/A	N/A
19	Anantapur	Tadpatri	Aluru	N/A	N/A	N/A	N/A	N/A	N/A
20	Anantapur	Tadpatri	Hassainpuram	N/A	N/A	N/A	N/A	N/A	N/A
21	Anantapur	Tadpatri	Virapuram	N/A	N/A	N/A	N/A	N/A	N/A
22	Anantapur	Tadpatri	Urachintala	N/A	N/A	N/A	N/A	N/A	N/A
Transmission Line Villages									
23	Y.S.R.	Kondapuram	K Sirige Palle	N/A	N/A	N/A	N/A	N/A	N/A
24	Kurnool	Koilkuntla	Ummaipalle	N/A	N/A	N/A	N/A	N/A	N/A
25	Kurnool	Koilkuntla	Thollamadugu	N/A	N/A	N/A	N/A	N/A	N/A
26	Kurnool	Koilkuntla	Shotriam Chennampalle	N/A	N/A	N/A	N/A	N/A	N/A
27	Kurnool	Koilkuntla	Nandipadu	N/A	N/A	N/A	N/A	N/A	N/A
28	Kurnool	Koilkuntla	Thimmanayunipeta	N/A	N/A	N/A	N/A	N/A	N/A

Source: Census 2011

The provided data reveals the distribution of Scheduled Castes (SC) and Scheduled Tribes (ST) populations across various villages in Y.S.R., Anantapur, and Kurnool districts, categorized into Project Villages, Core Villages, Buffer Villages, and Transmission Line Villages.

In Y.S.R. District, Kondapuram and Jammalamadugu tehsils are home to tribal communities such as the Konda Reddy and Chenchu tribes. In Anantapur District's Tadpatri tehsil, the Yerukula and Konda Reddy tribes are present. Kurnool District's Kolimigundla and Koilkuntla tehsils also feature the Konda Reddy tribe. These tribes contribute to the diverse cultural landscape of their regions, each with distinct traditions and practices.

In Y.S.R. District, Koduru, a Project Village in Kondapuram Tehsil, has a significant SC population at 22.15%, with no ST presence. Conversely, Chamaluru in the same district exhibits a higher SC percentage of 33.44%, also with no ST population. Sirigepalle in Jammalamadugu Tehsil shows a low SC population of 2.15% but a substantial ST population of 29.17%, highlighting a diverse socio-economic composition. Several Core Villages, including Sankepalle, Kottapalle, Muragampalle, and Chhatram, lack specific demographic data, which limits a comprehensive analysis.

In Anantapur District, Bodaipalle has an SC population of 20.46% and no ST population, while Buffer Villages such as Talaricheruvu and Bondaladinne report SC populations of 20.30% and 21.35%, respectively, with minimal or no ST presence. Vanganur has a lower SC percentage of 17.63%, with no ST population, indicating a relatively homogenous social structure.

Kurnool District's Erragudi, a Project Village, has a SC population of 13.18% and a small ST population of 2.27%. Transmission Line Villages, including those in Kurnool, lack detailed demographic data, preventing a full assessment of their SC and ST populations.

Overall, the data demonstrates variability in the SC and ST populations across the districts, with some villages showing significant proportions of SCs and others focusing more on STs. The gaps in data for several villages suggest a need for more comprehensive demographic information to address specific needs and allocate resources effectively.

In the regions of Kondapuram and Jammalamadugu in Y.S.R. District, Tadpatri in Anantapur District, and Kolimigundla and Koilkuntla in Kurnool District, there is minimal or no specific mention of Particularly Vulnerable Tribal Groups (PVTGs). While these areas have tribal populations, detailed information on PVTGs is not prominently available for these tehsils. The presence of general tribal communities is acknowledged, but no specific PVTGs are highlighted in these districts.

Sr. No.	District	Tehsil	Project Villages	No. of Households	Population	%SC population	%ST Population
Project Villages							
1	Y.S.R.	Kondapuram	Koduru	696	2808	22.15	0.00
2	Anantapur	Tadpatri	Bodaipalle	317	1300	20.46	0.00
Core Villages							
3	Anantapur	Tadpatri	Velamakur				
4	Y.S.R.	Kondapuram	Chamaluru	244	930	33.44	0.00
5	Kurnool	Kolimigundla	Erragudi	300	1191	13.18	2.27
6	Y.S.R.	Jammalamadugu	Sirigepalle	236	929	2.15	29.17
7	Y.S.R.	Jammalamadugu	Sankepalle	N/A	N/A	N/A	N/A
8	Y.S.R.	Jammalamadugu	Kottapalle	N/A	N/A	N/A	N/A
9	Y.S.R.	Jammalamadugu	Muragampalle	N/A	N/A	N/A	N/A
10	Y.S.R.	Jammalamadugu	Chhatram	N/A	N/A	N/A	N/A
Buffer Villages							
11	Anantapur	Tadpatri	Talaricheruvu	387	1483	20.30	2.63
12	Anantapur	Tadpatri	Vanganur	176	590	17.63	0.00
13	Anantapur	Tadpatri	Bondaladinne	269	1115	21.35	0.00
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	297	1172	27.73	0.34
15	Y.S.R.	Kondapuram	Jogapuram	17	65	0.00	0.00

Sr. No.	District	Tehsil	Project Villages	No. of Households	Population	%SC population	%ST Population
16	Y.S.R.	Kondapuram	Tallaproddaturu	N/A	N/A	N/A	N/A
17	Y.S.R.	Kondapuram	Dobbudapalle	N/A	N/A	N/A	N/A
18	Y.S.R.	Kondapuram	Dattapuram	N/A	N/A	N/A	N/A
19	Anantapur	Tadpatri	Aluru	N/A	N/A	N/A	N/A
20	Anantapur	Tadpatri	Hassainpuram	N/A	N/A	N/A	N/A
21	Anantapur	Tadpatri	Virapuram	N/A	N/A	N/A	N/A
22	Anantapur	Tadpatri	Urachintala	N/A	N/A	N/A	N/A
Transmission Line Villages							
23	Y.S.R.	Kondapuram	K Sirige Palle	N/A	N/A	N/A	N/A
24	Kurnool	Koilkuntla	Ummaipalle	N/A	N/A	N/A	N/A
25	Kurnool	Koilkuntla	Thollamadugu	N/A	N/A	N/A	N/A
26	Kurnool	Koilkuntla	Shotrium Chennampalle	N/A	N/A	N/A	N/A
27	Kurnool	Koilkuntla	Nandipadu	N/A	N/A	N/A	N/A
28	Kurnool	Koilkuntla	Thimmanayunipeta	N/A	N/A	N/A	N/A

Source: Census 2011

4.3.9.2 Gender Profile

The data reveals notable regional differences in sex ratios, literacy rates, and workforce participation across villages in Y.S.R., Anantapur, and Kurnool districts. In terms of sex ratios, the figures range from a lower ratio of 902 in Chamaluru to a higher ratio of 1,097 in Jogapuram, indicating varying gender balances. The child sex ratio also shows significant variation, with Erragudi having a notably higher ratio of 1,205, suggesting better survival rates for female children compared to other areas.

Literacy rates differ considerably, with project villages showing lower educational attainment. For example, male literacy rates range from 57.82% in Sirigepalle to 71.76% in Erragudi, while female literacy rates vary from 39.80% in Sirigepalle to 46.84% in Erragudi. Buffer villages, however, exhibit higher literacy levels, with Talaricheruvu reporting the highest male literacy rate of 82.06% and female literacy rate of 65.87%. This indicates that educational outcomes are generally better in buffer villages compared to project villages.

Workforce participation also varies significantly. Male workforce participation is highest in Jogapuram at 75.00%, while female participation peaks in Erragudi at 53.35%. In contrast, female workforce participation is considerably lower in Talaricheruvu at 34.94%, which could be due to fewer economic opportunities or traditional gender roles.

Several villages lack complete data, particularly those in core, buffer, and transmission line categories, which limits the full analysis of socio-economic conditions. Overall, the data highlights significant disparities in literacy and workforce participation across these regions, suggesting the need for targeted interventions to address educational and economic gaps in the less advantaged areas.

Sr. No.	District	Tehsil	Project Villages	Sex Ratio	Child Sex Ratio	Male Literates	Female Literates	Male Workers	Female Workers
Project Villages									
1	Y.S.R.	Kondapuram	Koduru	982	994	70.16	48.48	70.97	41.23
2	Anantapur	Tadpatri	Bodaipalle	1009	1155	68.58	45.18	69.27	53.94
Core Villages									
3	Anantapur	Tadpatri	Velamakur						
4	Y.S.R.	Kondapuram	Chamaluru	902	842	67.82	40.71	71.76	72.01

Sr. No.	District	Tehsil	Project Villages	Sex Ratio	Child Sex Ratio	Male Literates	Female Literates	Male Workers	Female Workers
5	Kurnool	Kolimigundla	Erragudi	985	1205	71.76	46.84	62.59	53.35
6	Y.S.R.	Jammalamadugu	Sirigepalle	964	914	57.82	39.80	70.72	61.73
7	Y.S.R.	Jammalamadugu	Sankepalle	N/A	N/A	N/A	N/A	N/A	N/A
8	Y.S.R.	Jammalamadugu	Kottapalle	N/A	N/A	N/A	N/A	N/A	N/A
9	Y.S.R.	Jammalamadugu	Muragampalle	N/A	N/A	N/A	N/A	N/A	N/A
10	Y.S.R.	Jammalamadugu	Chhatram	N/A	N/A	N/A	N/A	N/A	N/A
Buffer Villages									
11	Anantapur	Tadpatri	Talaricheruvu	934	800	82.06	65.87	68.87	34.94
12	Anantapur	Tadpatri	Vanganur	1014	889	76.32	48.72	65.04	51.65
13	Anantapur	Tadpatri	Bondaladinne	949	688	73.28	51.18	64.31	47.06
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	993	1048	82.51	60.69	63.31	52.22
15	Y.S.R.	Kondapuram	Jogapuram	1097	667	100.00	75.00	75.00	43.75
16	Y.S.R.	Kondapuram	Tallaproddaturu	N/A	N/A	N/A	N/A	N/A	N/A
17	Y.S.R.	Kondapuram	Dobbudapalle	N/A	N/A	N/A	N/A	N/A	N/A
18	Y.S.R.	Kondapuram	Dattapuram	N/A	N/A	N/A	N/A	N/A	N/A
19	Anantapur	Tadpatri	Aluru	N/A	N/A	N/A	N/A	N/A	N/A
20	Anantapur	Tadpatri	Hassainpuram	N/A	N/A	N/A	N/A	N/A	N/A
21	Anantapur	Tadpatri	Virapuram	N/A	N/A	N/A	N/A	N/A	N/A
22	Anantapur	Tadpatri	Urachintala	N/A	N/A	N/A	N/A	N/A	N/A
Transmission Line Villages									
23	Y.S.R.	Kondapuram	K Sirige Palle	N/A	N/A	N/A	N/A	N/A	N/A
24	Kurnool	Koilkuntla	Ummaipalle	N/A	N/A	N/A	N/A	N/A	N/A
25	Kurnool	Koilkuntla	Thollamadugu	N/A	N/A	N/A	N/A	N/A	N/A
26	Kurnool	Koilkuntla	Shotrium Chennampalle	N/A	N/A	N/A	N/A	N/A	N/A
27	Kurnool	Koilkuntla	Nandipadu	N/A	N/A	N/A	N/A	N/A	N/A
28	Kurnool	Koilkuntla	Thimmanayunipeta	N/A	N/A	N/A	N/A	N/A	N/A

Source: Census 2011

Women's participation in the workforce varies across these areas. For instance, in Erragudi (Kurnool District), female workforce participation is notably high at 53.35%, while in Talaricheruvu (Anantapur District), it is relatively low at 34.94%. These variations reflect differing economic opportunities and societal norms impacting women's employment.

The enrollment ratio of girl children in higher secondary education is often influenced by local socio-economic conditions. In buffer villages like Talaricheruvu, educational attainment is generally higher, indicating better enrollment rates for girls in higher secondary education. However, exact figures for all villages are not detailed, and disparities likely exist between different regions.

In India, property rights for women are legally protected under various laws, including the Hindu Succession Act and the Indian Succession Act. However, societal norms and implementation challenges often limit women's access to property rights in practice.

Women's political participation has increased due to reservations in Panchayat elections, with a minimum of 33% of seats reserved for women. This policy aims to enhance women's decision-making roles at the local level, though actual impact varies by region and implementation.

Tobacco use and alcohol consumption among adults also vary by region. Data specific to these districts suggest that alcohol consumption is prevalent in rural areas, and tobacco use is a common issue among both men and women. Public health initiatives are needed to address these issues effectively.

For Ananthapuram, the NFHS-5 (2019-21) data indicates that 5.0% of women aged 15 years and above use tobacco, with alcohol consumption at a low 0.6%. For men, tobacco use is notably higher at 20.5%, while alcohol consumption was 16.8% according to NFHS-4 (2015-16). The absence of comparative data for NFHS-5 limits a full trend analysis, but it is evident that men have higher rates of both tobacco and alcohol use compared to women.

For Kurnool, the NFHS-5 (2019-21) data shows that 2.1% of women aged 15 and above use tobacco and 0.4% consume alcohol. Among men in the same age group, tobacco use is significantly higher at 19.9%, and alcohol consumption is also notable at 20.0%. The data underscores a higher prevalence of tobacco and alcohol use among men compared to women. Unfortunately, comparable NFHS-4 (2015-16) data is not available for a detailed trend analysis.

For Y.S.R, the NFHS-5 (2019-21) data indicates that 3.1% of women aged 15 and above use tobacco, and 0.2% consume alcohol. For men in the same age group, tobacco use is 18.0%, and alcohol consumption is 16.0%. These figures reveal that tobacco and alcohol use are more prevalent among men than women. The absence of comparable NFHS-4 (2015-16) data prevents a full historical comparison, but the current data highlights a notable gender disparity in substance use.

4.3.9.3 Literacy and Education

Sr. No.	District	Tehsil	Project Villages	Population	Literates	Male Literacy	Female Literacy (%)
Project Villages							
1	Y.S.R.	Kondapuram	Koduru	2808	59.43	70.16	48.48
2	Anantapur	Tadpatri	Bodaipalle	1300	56.93	68.58	45.18
Core Villages							
3	Anantapur	Tadpatri	Velamakur	N/A	N/A	N/A	N/A
4	Y.S.R.	Kondapuram	Chamaluru	930	54.91	67.82	40.71
5	Kurnool	Kolimigundla	Erragudi	1191	59.51	71.76	46.84
6	Y.S.R.	Jammalamadugu	Sirigepalle	929	48.93	57.82	39.80
7	Y.S.R.	Jammalamadugu	Sankepalle	N/A	N/A	N/A	N/A
8	Y.S.R.	Jammalamadugu	Kottapalle	N/A	N/A	N/A	N/A
9	Y.S.R.	Jammalamadugu	Muragampalle	N/A	N/A	N/A	N/A
10	Y.S.R.	Jammalamadugu	Chhatram	N/A	N/A	N/A	N/A
Buffer Villages							
11	Anantapur	Tadpatri	Talaricheruvu	1483	74.14	82.06	65.87
12	Anantapur	Tadpatri	Vanganur	590	62.34	76.32	48.72
13	Anantapur	Tadpatri	Bondaladinne	1115	62.38	73.28	51.18
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	1172	71.67	82.51	60.69
15	Y.S.R.	Kondapuram	Jogapuram	65	86.67	100.00	75.00
16	Y.S.R.	Kondapuram	Tallaproddaturu	N/A	N/A	N/A	N/A
17	Y.S.R.	Kondapuram	Dobbudapalle	N/A	N/A	N/A	N/A
18	Y.S.R.	Kondapuram	Dattapuram	N/A	N/A	N/A	N/A

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19	Anantapur	Tadpatri	Aluru	N/A	N/A	N/A	N/A
20	Anantapur	Tadpatri	Hassainpuram	N/A	N/A	N/A	N/A
21	Anantapur	Tadpatri	Virapuram	N/A	N/A	N/A	N/A
22	Anantapur	Tadpatri	Urachintala	N/A	N/A	N/A	N/A

Transmission Line Villages

23	Y.S.R.	Kondapuram	K Sirige Palle	N/A	N/A	N/A	N/A
24	Kurnool	Koilkuntla	Ummaipalle	N/A	N/A	N/A	N/A
25	Kurnool	Koilkuntla	Thollamadugu	N/A	N/A	N/A	N/A
26	Kurnool	Koilkuntla	Shotrium Chennampalle	N/A	N/A	N/A	N/A
27	Kurnool	Koilkuntla	Nandipadu	N/A	N/A	N/A	N/A
28	Kurnool	Koilkuntla	Thimmanayunipeta	N/A	N/A	N/A	N/A

Source: Census 2011

In Koduru (Kondapuram, Y.S.R. District), literacy rates are relatively low, with 59.43% of the population being literate. Male literacy is significantly higher at 70.16% compared to female literacy at 48.48%. Similarly, in Bodaipalle (Tadpatri, Anantapur District), the overall literacy rate is 56.93%, with male literacy at 68.58% and female literacy at 45.18%.

Chamaluru (Kondapuram, Y.S.R. District) has a slightly lower literacy rate of 54.91%, with male literacy at 67.82% and female literacy at 40.71%. Erragudi (Kolimigundla, Kurnool District) shows a better overall literacy rate of 59.51%, with a higher male literacy rate of 71.76% and a female literacy rate of 46.84%.

Sirigepalle (Jammalamadugu, Y.S.R. District) has the lowest literacy rate among the project villages at 48.93%, with male literacy at 57.82% and female literacy at 39.80%.

In contrast, Buffer Villages like Talaricheruvu and Vanganur in Anantapur District exhibit higher literacy rates, with Talaricheruvu having a literacy rate of 74.14% and Vanganur at 62.34%. These villages also show a significant gap in male and female literacy, though the gap is less pronounced compared to other areas.

Overall, the data indicates that while some villages exhibit high literacy rates, significant gender disparities remain, with male literacy consistently outpacing female literacy across the surveyed areas.



Source: Census 2011

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4.3.9.4 Occupation and Livelihood

Kurnool district in Andhra Pradesh features a diverse industrial landscape that includes agriculture-based industries, such as food processing and tobacco, leveraging the region's rich agricultural base. The district is notable for its granite mining and processing industries, supported by local granite deposits, and also hosts cement plants utilizing its limestone reserves. Additionally, textile mills and garment manufacturing units benefit from the region's cotton production, while the construction sector is bolstered by cement plants and brick production. The district is seeing growth in renewable energy, particularly solar power, and houses small-scale manufacturing units producing engineering goods and automobile parts. Additionally, Y.S.R. District in Andhra Pradesh, formerly Kadapa, boasts a diverse industrial sector. Key industries include granite mining and processing, cement manufacturing using local limestone, and agriculture-based industries like food processing and rice milling. The district also has a growing textile and garment sector, small-scale engineering units, and is expanding into renewable energy, particularly solar power. Similarly, Ananthapuram District in Andhra Pradesh is known for granite mining and processing, cement production using local limestone, and agriculture-based industries like food processing and rice milling. The district is also growing its textile sector and small-scale manufacturing, while investing in solar power to support industrial and economic development.

Sr. No.	District	Tehsil	Project Villages	Working Population	Male Workers	Female Workers	Main Workers	Cultivators	Agri Labours	Household Workers	Other Workers
Project Villages											
1	Y.S.R.	Kondapuram	Koduru	56.25	70.97	41.23	99.49	35.23	58.52	0.87	5.39
2	Anantapur	Tadpatri	Bodaipalle	61.64	69.27	53.94	97.45	24.96	59.65	1.02	14.37
Core Villages											
3	Anantapur	Tadpatri	Velamakur	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	Y.S.R.	Kondapuram	Chamalur	71.88	71.76	72.01	100.00	18.55	75.21	0.17	6.07
5	Kurnool	Kolimigundla	Erragudi	58.04	62.59	53.35	99.37	26.47	48.02	6.97	18.54
6	Y.S.R.	Jammalamadugu	Sirigepalle	66.29	70.72	61.73	80.65	46.35	27.76	4.00	21.88
7	Y.S.R.	Jammalamadugu	Sankepalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8	Y.S.R.	Jammalamadugu	Kottapalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Y.S.R.	Jammalamadugu	Muragampalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10	Y.S.R.	Jammalamadugu	Chhatram	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Buffer Villages											
11	Anantapur	Tadpatri	Talaricheruvu	52.27	68.87	34.94	88.01	7.50	25.72	2.21	64.57
12	Anantapur	Tadpatri	Vanganur	58.26	65.04	51.65	97.13	20.66	61.64	0.66	17.05
13	Anantapur	Tadpatri	Bondaladinne	55.80	64.31	47.06	55.98	32.82	33.75	1.55	31.89
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	57.80	63.31	52.22	41.39	35.20	28.80	0.40	35.60
15	Y.S.R.	Kondapuram	Jogapuram	58.33	75.00	43.75	68.57	91.67	0.00	0.00	8.33
16	Y.S.R.	Kondapuram	Tallaprodatturu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	Y.S.R.	Kondapuram	Dobbudapalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
18	Y.S.R.	Kondapuram	Dattapuram	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
19	Anantapur	Tadpatri	Aluru	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
20	Anantapur	Tadpatri	Hassainpuram	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
21	Anantapur	Tadpatri	Virapuram	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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Sr. No.	District	Tehsil	Project Villages	Working Population	Male Workers	Female Workers	Main Workers	Cultivators	Agri Labours	Household Workers	Other Workers
22	Anantapur	Tadpatri	Urachintala	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Transmission Line Villages											
23	Y.S.R.	Kondapuram	K Sirige Palle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
24	Kurnool	Koilkuntla	Ummaipalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
25	Kurnool	Koilkuntla	Thollamadugu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
26	Kurnool	Koilkuntla	Shotriam Chennampalle	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
27	Kurnool	Koilkuntla	Nandipadu	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
28	Kurnool	Koilkuntla	Thimmanayunipeta	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Source: Census 2011

In Koduru (Kondapuram, Y.S.R. District), the working population is predominantly engaged in main work (99.49%), with a substantial proportion in agriculture (35.23% cultivators and 58.52% agricultural laborers). Female participation in work is significantly lower at 41.23%.

In Bodaipalle (Tadpatri, Anantapur District), the working population is highly engaged in main work (97.45%), with a notable portion as agricultural laborers (59.65%) and cultivators (24.96%). Female workers are also more active here at 53.94%.

Chamaluru (Kondapuram, Y.S.R. District) has a high percentage of main workers (100%), with a significant focus on agricultural labor (75.21%). Female workers are nearly as active as male workers (72.01%).

Erragudi (Kolimigundla, Kurnool District) shows a high engagement in agriculture (99.37% main workers), with substantial female participation (53.35%) and a significant portion as agricultural laborers (48.02%).

In Sirigepalle (Jammalamadugu, Y.S.R. District), 80.65% of the working population are main workers, with a considerable number in agriculture (46.35% cultivators and 27.76% agricultural laborers). Female participation is notably lower at 61.73%.

Overall, the data indicates a strong reliance on agricultural work across these villages, with significant variations in female participation and types of employment.

4.3.9.5 Agriculture and Allied Activities

In Kurnool, Y.S.R., and Ananthapuram districts of Andhra Pradesh, the soil types vary, supporting diverse agricultural practices suited to the region's climatic conditions.

Kurnool District predominantly features red sandy soils, which are well-drained and suitable for cultivating crops like groundnuts and sunflower. Additionally, black cotton soils are found in certain areas, known for their moisture-retaining properties and suitability for crops such as cotton and paddy.

Y.S.R. District (formerly Kadapa) primarily has red soils that are acidic and low in fertility but can support crops like groundnuts and cotton with appropriate soil management. There are also patches of black soils, which are rich in nutrients and ideal for growing paddy and pulses.

Ananthapuram District is characterized by red sandy soils and black soils, with the red sandy soils being prevalent in the drier regions, suitable for crops like groundnuts and sunflower. The black soils, found in areas with better moisture retention, are conducive to the cultivation of cotton and paddy.

These soil types play a crucial role in determining the agricultural practices and crop selection in each district.

There is only one main source of irrigation in the Project Villages: wells/tube wells. The percentage of total irrigated land by sources varies among the villages, indicating different levels of availability and accessibility of water resources and irrigation infrastructure. The Project Villages and Core Villages show a similar pattern, with no canal-irrigated land but significant areas under well or tube

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well irrigation, 337 hectares and 221.18 hectares respectively. The Buffer Villages follow suit, with no canal irrigation and 171 hectares of well/tube well-irrigated land. However, the Transmission Line Villages present a more diverse scenario, with no canal irrigation, 87 hectares of well/tube well-irrigated land, and a notable 69 hectares of tank or lake-irrigated landAs per Department of Agriculture, Andhra Pradesh²⁶, rain dependent tanks form the chief source of irrigation with seasonal rivers and rivulets and wells are the other sources of irrigation.

4.3.9.6 Village Infrastructure

4.3.9.6.1 Education Infrastructure

Government Education facilities in the villages –Higher education facility – Nearest College- ITI / Skill development centers – Distance of these facilities

Sr. No.	District	Tehsil	Project Villages	Schools in Study Area			
				Primary	Middle	Secondary	Total
Project Villages							
1	Y.S.R.	Kondapuram	Koduru	3	0	1	4
2	Anantapur	Tadpatri	Bodaipalle	1	0	1	2
Core Villages							
3	Anantapur	Tadpatri	Velamakur	1	0	0	1
4	Y.S.R.	Kondapuram	Chamaluru	1	0	0	1
5	Kurnool	Kolimigundla	Erragudi	1	0	1	2
6	Y.S.R.	Jammalamadugu	Sirigepalle	2	0	0	2
7	Y.S.R.	Jammalamadugu	Sankepalle	NA	NA	NA	NA
8	Y.S.R.	Jammalamadugu	Kottapalle	NA	NA	NA	NA
9	Y.S.R.	Jammalamadugu	Muragampalle	NA	NA	NA	NA
10	Y.S.R.	Jammalamadugu	Chhatram	NA	NA	NA	NA
Buffer Villages							
11	Anantapur	Tadpatri	Talaricheruvu	2	0	0	2
12	Anantapur	Tadpatri	Vanganur	1	0	0	1
13	Anantapur	Tadpatri	Bondaladinne	1	1	0	2
14	Y.S.R.	Kondapuram	K.Sugumanchipalle	1	0	0	1
15	Y.S.R.	Kondapuram	Jogapuram	1	0	0	1
16	Y.S.R.	Kondapuram	Tallaprodaturu	NA	NA	NA	NA
17	Y.S.R.	Kondapuram	Dobbudapalle	NA	NA	NA	NA
18	Y.S.R.	Kondapuram	Dattapuram	NA	NA	NA	NA
19	Anantapur	Tadpatri	Aluru	NA	NA	NA	NA
20	Anantapur	Tadpatri	Hassainpuram	NA	NA	NA	NA
21	Anantapur	Tadpatri	Virapuram	NA	NA	NA	NA

²⁶ Department of Agriculture, Andhra Pradesh: <https://kadapa.ap.gov.in/>

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22	Anantapur	Tadpatri	Urachintala	NA	NA	NA	NA
Transmission Line Villages							
23	Y.S.R.	Kondapuram	K Sirige Palle	NA	NA	NA	NA
24	Kurnool	Koilkuntla	Ummaipalle	NA	NA	NA	NA
25	Kurnool	Koilkuntla	Thollamadugu	3	0	0	3
26	Kurnool	Koilkuntla	Shotrium Chennampalle	NA	NA	NA	NA
27	Kurnool	Koilkuntla	Nandipadu	1	0	0	1
28	Kurnool	Koilkuntla	Thimmanayunipeta	1	0	1	2

Source: Census 2011

In Tadpatri tehsil, there is a range of government schools providing primary and secondary education. Notable institutions include Government Zilla Parishad High School and Government Primary Schools across various villages. For higher education, Tadpatri has a Government Degree College offering undergraduate courses in arts, science, and commerce. Additionally, the area benefits from initiatives aimed at improving education infrastructure and quality, such as the "Mana Badi" program which focuses on upgrading school facilities.

Kondapuram tehsil features several government schools that cater to primary and secondary education needs. Government High Schools and Primary Schools are spread across various villages in the tehsil. Kondapuram also has a Government Junior College providing education for intermediate courses. The tehsil benefits from government schemes aimed at improving literacy rates and providing better educational resources to rural areas.

Jammalamadugu tehsil includes various government-run schools that offer primary and secondary education. The Government High School in Jammalamadugu is one of the key institutions, along with several other primary schools in the region. For higher education, Jammalamadugu has a Government Degree College that offers undergraduate courses. The area also benefits from various educational schemes and programs designed to enhance access to quality education.

In Kolimigundla tehsil, government educational facilities include primary and secondary schools spread across different villages. The Government High School in Kolimigundla provides secondary education, while there are several government primary schools throughout the tehsil. Higher education facilities are relatively limited, but students can access nearby towns for more advanced studies. Government initiatives focus on improving educational infrastructure and providing better resources for students.

4.3.9.6.2 Health Care Facilities

In Kurnool, Y.S.R., and Ananthapuram districts of Andhra Pradesh, the government healthcare system operates through a well-defined three-tier model designed to provide comprehensive care across various levels. At the grassroots level, Sub-Centres deliver essential healthcare services such as maternal and child care, immunizations, and treatment for common illnesses. These facilities are strategically located in rural areas to ensure that primary healthcare is accessible to even the most remote communities. Building on this foundation, Primary Health Centres (PHCs) offer a broader range of services, including treatment for more serious conditions, minor surgical procedures, and basic diagnostic services. PHCs serve as a critical link between Sub-Centres and higher-level facilities and are typically situated in larger towns or sub-districts to cater to surrounding areas.

For more comprehensive care, Community Health Centres (CHCs) provide specialized consultations, emergency care, and advanced diagnostics. CHCs operate at the block or sub-district level, handling more complex cases and acting as crucial support for both PHCs and Sub-Centres. At the highest level, District Hospitals offer advanced medical care including surgeries, specialized treatments, and emergency services. These hospitals, located in the district headquarters, are equipped with extensive facilities to manage serious cases referred from lower-tier centres.

Residents of these districts have access to a network of government healthcare facilities, including Sub-Centres, PHCs, and CHCs, with District Hospitals in Kurnool, Y.S.R., and Ananthapuram providing advanced care. While government facilities offer essential services at subsidized rates, they may face challenges such as overcrowding and resource limitations. Many residents also turn to private hospitals and clinics, which provide quicker access and better amenities but at higher costs. The choice between government and private care often depends on the urgency of the medical condition and the financial situation of the individuals.

Public attitudes towards medical care vary, especially between rural and urban areas. In rural regions, people might initially rely on traditional remedies or self-medication before seeking formal healthcare due to cultural beliefs, financial constraints, or limited awareness. Conversely, urban residents are generally more inclined to seek timely medical care, often using a mix of government and private facilities based on their needs.

Government initiatives have also focused on improving post-natal care and increasing institutional births. Programs aimed at enhancing immunization rates are implemented through PHCs and CHCs, crucial for preventing diseases and promoting child health. Additionally, schemes like Janani Suraksha Yojana (JSY) incentivize institutional deliveries to reduce maternal and infant mortality, improving the safety and quality of childbirth.

Ambulance services, provided through the National Ambulance Service (108) and state-specific programs, are intended to ensure timely emergency transportation to healthcare facilities. Despite improvements in coverage, challenges such as road conditions, availability of ambulances, and response times can impact the effectiveness of these services. Efforts continue to address these challenges and enhance emergency response capabilities.

In Y.S.R district, 99.4% of births are institutional, and 83% of the children aged between 12-23 months are fully vaccinated. For Kurnool district, the institutional birth rate is 88.5%, while rate of vaccination for children aged between 12-23 months is 67%. Similarly for Ananthapuram district, 94.7% of all births are institutional, and 81.8% of all children aged between 12-23 months of age are fully vaccinated.

Overall, the healthcare system in Kurnool, Y.S.R., and Ananthapuram districts is designed to provide tiered and comprehensive care, with ongoing efforts needed to address infrastructure, accessibility, and public awareness to improve health outcomes in these regions.

4.3.9.6.3 Drinking Water and Sanitation

As of 2024, Andhra Pradesh has made notable progress in improving drinking water and sanitation, though challenges remain. In terms of drinking water, the state relies on various sources including rivers, reservoirs, and groundwater. While urban areas generally experience better access to reliable water supplies, rural regions still face issues with infrastructure and water quality, often due to contamination and seasonal variability. The government has been actively working to address these issues through initiatives like the Jal Jeevan Mission, which aims to provide piped water to all households, and the Swachh Bharat Mission, which seeks to enhance both urban and rural sanitation.

The data shows that all villages except Nandipadu and Thimmanayunipeta have access to treated tap water, which is the most reliable and safe source of water for drinking and cooking. Treated tap water is supplied by municipal or private water systems that use various methods such as filtration, disinfection, and chlorination to remove contaminants and pathogens from the water. Treated tap water can also reduce the risk of waterborne diseases such as diarrhea, cholera, typhoid, and dysentery.

Only Koduru access to untreated tap water, which is the most common and convenient source of water for domestic use. Untreated tap water may contain various pollutants such as sediments, organic matter, chemicals, metals, and microbes that can affect the taste, odor, color, and quality of the water.

Chamaluru, Sirigepalle, Nandipadu and Thimmanayunipeta have access to uncovered wells, which are shallow wells dug in the ground to access groundwater. Uncovered wells are usually open to the air and exposed to various sources of contamination such as surface runoff, animal waste, human activity, and insects. Uncovered wells may also dry up during droughts or get flooded during rains. Uncovered wells can also cause health problems if the water is not boiled or filtered before use.

None of the villages have access to covered wells, which are deep wells drilled in the ground to access groundwater. Covered wells are usually sealed with a concrete slab or a metal lid to prevent contamination from external sources. Covered wells may also have a hand pump or an electric pump to draw water from the well. Covered wells can provide a more reliable and safer source of water than uncovered wells, as they are less prone to pollution and depletion. Covered wells can also reduce the need for boiling or filtering the water before use.

All villages have access to hand pumps, which are devices that use manual force to pump water from a well or a borehole. Hand pumps are usually installed on covered wells or tube wells/boreholes to provide a convenient and easy way of accessing groundwater. Hand pumps can also prevent contamination from human or animal contact with the water source. Hand pumps can also improve the quality and quantity of water available for domestic use. Bodaipalle, Velamakur, Sirigepalle, Talaricheruvu, Jogapuram, Nandipadu and Thimmanayunipeta have access to tube wells/boreholes, which are narrow holes drilled deep into the ground to access groundwater. Tube wells/boreholes are usually fitted with a casing or a pipe to prevent collapse and contamination of the hole. Tube wells/boreholes may also have a hand pump or an electric pump to draw water from the hole. Tube wells/boreholes can provide a more abundant and consistent source of water than shallow wells, as they tap into deeper aquifers

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that have more storage capacity and recharge potential. Tube wells/boreholes can also improve the quality and quantity of water available for domestic use. Moreover, none of the villages have access to springs, which are natural outlets where groundwater emerges on the surface. Springs are usually found in hilly or mountainous areas where the groundwater table intersects with the land surface.

Only Bodaipalle has access to rivers/canals, which are natural or artificial channels that carry surface water from one place to another. Rivers/canals are usually found in flat or low-lying areas where there is sufficient rainfall or snowmelt to feed them. Rivers/canals can provide a large and continuous source of water for various purposes such as irrigation, navigation, fishing, hydropower, etc. Rivers/canals can also enhance the scenic beauty and cultural heritage of the area. Rivers/canals can also sustain biodiversity and ecosystem services in the area. Only Bodaipalle has access to rivers/canals, which are natural or artificial channels that carry surface water from one place to another. Rivers/canals are usually found in flat or low-lying areas where there is sufficient rainfall or snowmelt to feed them. Rivers/canals can provide a large and continuous source of water for various purposes such as irrigation, navigation, fishing, hydropower, etc. Rivers/canals can also enhance the scenic beauty and cultural heritage of the area. Rivers/canals can also sustain biodiversity and ecosystem services in the area. Only Koduru, Velamakur, and Thollamadugu have access to a tank/pond/lake, which is a natural or artificial body of water that is enclosed by land. Tanks/ponds/lakes are usually found in areas where there is enough rainfall or runoff to fill them. Tanks/ponds/lakes can provide a local and accessible source of water for domestic use, especially during dry seasons.

Tanks/ponds/lakes can also serve as a storage and buffer for excess water during wet seasons. Tanks/ponds/lakes can also offer recreational and aesthetic benefits for the villagers. Tanks/ponds/lakes can also support biodiversity and ecosystem services in the area.

Sanitation has seen significant advancements, especially in rural areas where the Swachh Bharat Mission (Gramin) has driven improvements in toilet construction and hygiene practices. Despite this, maintaining and managing sanitation facilities remains a challenge in some areas. Urban sanitation infrastructure has also improved with the development of sewage treatment plants and better waste management systems. However, rapid urban growth often strains existing infrastructure, leading to ongoing issues in wastewater and solid waste management. Public attitudes towards using sanitation facilities are influenced by factors such as awareness, infrastructure quality, cultural practices, and economic conditions. Increased awareness and educational initiatives have positively impacted attitudes, particularly where sanitation facilities are well-maintained and accessible. However, traditional practices and economic constraints can sometimes hinder the adoption of modern sanitation practices. Government programs like Swachh Bharat Mission aim to improve both facilities and attitudes, and local community engagement plays a crucial role in fostering a more positive outlook on sanitation.

4.3.9.7 Religious and Archaeological Importance

Tadpatri is renowned for its Chintala Venkataramana Swamy Temple, dedicated to Lord Venkateswara. This temple is a significant religious site, with its annual Brahmotsavam festival being a major event. The festival typically takes place in September or October and draws many devotees. Another notable religious site in Tadpatri is the Narasimha Swamy Temple, dedicated to Lord Narasimha, an incarnation of Vishnu. The Narasimha Jayanti, celebrated around May or June, is an important festival here.

In Kondapuram, the Sri Lakshmi Narasimha Swamy Temple stands out for its ancient and architectural significance. The temple celebrates Narasimha Jayanti, usually observed in May, which attracts numerous devotees. Additionally, the Ranganatha Swamy Temple, known for its Dravidian architecture, is another important site. The festival of Vaikuntha Ekadashi, held in December or January, is a major celebration at this temple.

Jammalamadugu features the Sri Chennakesava Swamy Temple, dedicated to Lord Chennakesava (Vishnu). The temple is famous for its intricate carvings and hosts the Brahmotsavam festival around September. Another notable site is the Akkamahadevi Caves, which, while not a temple, are of considerable archaeological interest and reflect the region's historical heritage. The caves are visited during various local festivals.

Kolimigundla is home to the Sri Kodandarama Swamy Temple, dedicated to Lord Rama. The temple is a focal point for the Rama Navami festival, celebrated in March or April, which is a significant event for the local community. Another important religious site in the area is the Sri Kaleshwara Swamy Temple, dedicated to Lord Shiva. The festival of Shivaratri, observed in February or March, is a key celebration here, attracting many worshippers.

4.4 Ecological Baseline

To understand the ecological sensitivity and to establish an ecological baseline (flora and fauna) of the study area, an ecological survey was conducted between 13th – 17th June 2024. The main objective behind this exercise is to identify the possible impacts on

the species and habitats (present in the vicinity) due to the project-related activities, which ultimately help to select the mitigation and management strategy.

4.4.1 Objectives

The survey was conducted with the following objectives,

- Identification of internationally and/or nationally recognized areas of high biodiversity value e.g., Protected Areas (Pas), Key Biodiversity Areas (KBAs) / Important Bird and Biodiversity Areas (IBAs), Alliance for Zero Extinction (AZE) sites, etc.
- Identification of natural, and modified habitats falling within core and buffer zones.
- Documentation of floral and faunal [specifically herpetofauna (reptiles + amphibians), birds, and mammals] species based on direct sightings, calls, pugmarks (if any), etc.
- Trace out of any endangered or protected or restricted range floral species. Identification of any threatened (as per IUCN Red List), scheduled (as per Wildlife (Protection) Act, 1972), Endemic or restricted-range and migratory or congregatory faunal species (as defined in IFC PS 6) from the study area.
- Identification of potential wildlife migratory corridors, avian migratory routes, and other important areas for ecological reasons such as breeding, nesting, foraging, resting, etc. As the ESIA site survey has been proposed in the non-migratory season, local consultations will be utilised to understand the presence and movement of migratory birds.

4.4.2 Ecological Baseline – Methods

To understand the existing ecological conditions in the study area, an ecological baseline was prepared. This base line was prepared with the help of information gathered under, i. Literature Review and ii. Field Data Collection.

4.4.2.1 Literature Review

A literature review was performed to screen out the presence of internationally and/or nationally recognized areas of high biodiversity value e.g., Protected Areas (Pas), Alliance for Zero Extinction (AZE) sites, etc.; and habitat of IUCN Threatened and Restricted-range species; and Key Biodiversity Areas (KBAs), which include Important Bird and Biodiversity Areas (IBAs) in and around the proposed project location. A list of floral and faunal species was also prepared along with their conservation status (as per IUCN) and their status in the list of scheduled species [as per Wildlife (Protection) Act, 1972] utilizing collected secondary data during literature review. The dominant habitats in and around the project location was also identified with the help of google earth imagery and other available secondary data. The recognized (internationally and/or nationally) wildlife migratory corridors, and avian migratory routes were also identified with the available information.

4.4.2.2 Field Data Collection

A field survey was conducted to determine the existing ecological conditions (habitats, flora, and fauna) within the study area. This baseline facilitates an adequate assessment of the project's impacts upon ecology as well as it helps the development of appropriate mitigation measures. Habitats, which may support good biodiversity i.e., forest patches, scrubs, water bodies, etc. will be focused during the survey.

4.4.2.2.1 Habitat Survey

Different habitats available within the study area identified by the desktop review were verified through site visit. Data regarding the type and quality of habitat with reference to flora and fauna supported were collected.

4.4.2.2.2 Floral Survey

The floral diversity of the study area was recorded by visual observation during the site visit and identified using published manuals. The information (Scientific publications) dealing with the floristic diversity of the related area available in the public domain were also considered in the survey.

4.4.2.2.3 Faunal Survey

- I. Faunal species (specifically reptiles, birds, and mammals) from the study areas were recorded based on direct sightings, indirect evidence such as dung, droppings, scats, pugmarks, scratch signs, burrows, nests, etc.
- II. Consultations were carried out by displaying photographs of species anticipated in the area to confirm whether there have been any recent sightings. The photographs of the species were typically obtained from the authentic sources^{27,28};

²⁷ Grewal, B., Sen, S., Singh, S., Devasar, N. & Bhatia G. (2016) A pictorial Field Guide to Birds of India, Pakistan, Nepal, Bhutan, Sri Lanka, and Bangladesh. Om Books International, Noida, Uttar Pradesh, India.

²⁸ Menon, V., (2014), Indian Mammals: A Field Guide. Hachette, India

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- III. Identification and classification of any species recognized as Threatened (in accordance with International Union for the Conservation of Nature [IUCN] Red List Online Version 2024-1) and according to the schedules of the Wildlife (Protection) Act, 1972; and
- IV. Identification of areas which may be important or sensitive for ecological reasons including their breeding, nesting, foraging, resting, overwintering areas including wildlife migratory corridors/avian migratory routes through consultation specifically.

4.4.2.2.4 Sampling Efforts

Vehicular Transects:

The Vehicular Transect (VT) survey routes were chosen to ensure that every habitat type of the study area were covered. A total of 04 transects were established along the available motorable roads in the study area and marked using GIS. The length of the transects varied from 2.0 km to 5.0 km. The transects were sampled the vehicle maintaining a constant speed of ~20 km/hr.

The species observed within 20 m on both the sides were recorded. In the case of sensitive and large fauna, the species were recorded if identifiable, even if seen beyond 20 m. The routes of VT have been shown in **Figure 4:31**; and details of vehicular transect are given below,

Vehicular Transects	Length	Date	Start Time	End Time	Habitat Covering
Vehicular Transect 1 (VT 1)	5.0 km	13.06.2024	9:30 am	10:10 am	Scrub Land
Vehicular Transect 2 (VT 2)	2.0 km	13.06.2024	10:25 am	10:55 am	Agricultural Land
Vehicular Transect 3 (VT 3)	2.5 km	14.06.2024	7:10 am	7:40 am	Scrub Land
Vehicular Transect 4 (VT 4)	3.1 km	17.06.2024	5:00 pm	5:45 pm	Agricultural Land

Walk Through Transects:

The Walk Through Transect (WT) survey was conducted to cover the remaining habitat not covered through the Vehicular Transects and where no motorable roads were available. A total of 02 transects were established in the study area and marked using GIS. All the species observed within 20 m on both the sides were recorded. In the case of sensitive and large fauna, the species were recorded if identifiable, even if seen beyond 20 m. The routes of WT have been shown in **Figure 4:31**; and details of walk through transect are given below,

Walk Through Transects	Length	Date	Start Time	End Time	Habitat Covering
Walk Through Transect 1 (WT 1)	1.5 km	13.06.2024	6:10 am	7:00 am	Scrub Land
Walk Through Transect 2 (WT 2)	2.2 km	13.06.2024	7:50 am	8:25 am	Agricultural Land

Waterbody Survey:

To establish a strong baseline of aquatic birds, waterbodies present in the study area were visited during the survey. During the survey 05 waterbodies were surveyed in the study area (5 km buffer). These waterbodies have been shown in **Figure 4:31**; and the details of waterbodies were provided below,

Waterbody	Location	Date	Time	Availability of Water
Waterbody 1 (WB 1)	14.953625°, 78.066583°	13.06.2024	9:10 am	30%
Waterbody 2 (WB 2)	14.885040°, 78.110950°	13.06.2024	8:30 am	40%
Waterbody 3 (WB 3)	14.849664°, 78.088797°	14.06.2024	4:30 pm	5%
Waterbody 4 (WB 4)	14.929907°, 78.064023°	17.06.2024	4:45 pm	10%
Waterbody 5 (WB 5)	14.857887°, 78.133692°	17.06.2024	6:00 pm	5%

4.4.3 Ecological Baseline – Results

4.4.3.1 Literature Review – eBird Database

The historical data regarding the presence of residential as well as migratory birds in the region (~50 km radius from the project boundary) was extracted from the eBird Database²⁹. As per the eBird Database, at least 148 avifaunal species including three Vulnerable [River Tern (*Sterna aurantia*), White-naped Tit (*Machlolophus nuchalis*), & Yellow-throated Bulbul (*Pycnonotus xantholaemus*)]; four Near Threatened [Alexandrine Parakeet (*Palaeornis eupatria*), Black-headed Ibis (*Threskiornis melanocephalus*), Oriental Darter (*Anhinga melanogaster*), & Spot-billed Pelican (*Pelecanus philippensis*)]; and 07 Schedule I [Bonelli's Eagle (*Aquila fasciata*), Changeable Hawk-Eagle (*Nisaetus cirrhatus*), Eurasian Spoonbill (*Platalea leucorodia*), Indian Peafowl (*Pavo cristatus*), Montagu's Harrier (*Circus pygargus*), Peregrine Falcon (*Falco peregrinus*), & Shikra (*Accipiter badius*)] species have been reported from the region. 29 Migratory species (**Table 4-17**), and 08 Raptors (**Table 4-18**) species were also recorded from the region.

Table 4-17 Migratory birds reported from the region

S.N.Common English Name	Binomial Scientific Name	IUCN Red List – Categories	Wildlife (Protection) Act – Schedules
1 Ashy Drongo	<i>Dicrurus leucophaeus</i>	Least Concern	Schedule IV
2 Barn Swallow	<i>Hirundo rustica</i>	Least Concern	Not Listed
3 Blue-capped Rock-thrush	<i>Monticola cinclorhyncha</i>	Least Concern	Schedule IV
4 Blue-tailed Bee-eater	<i>Merops philippinus</i>	Least Concern	Schedule IV
5 Blyth's Reed Warbler	<i>Acrocephalus dumetorum</i>	Least Concern	Schedule IV
6 Brown Shrike	<i>Lanius cristatus</i>	Least Concern	Not Listed
7 Common Greenshank	<i>Tringa nebularia</i>	Least Concern	Schedule IV
8 Common Redshank	<i>Tringa totanus</i>	Least Concern	Schedule IV
9 Common Sandpiper	<i>Actitis hypoleucos</i>	Least Concern	Schedule IV
10 Glossy Ibis	<i>Plegadis falceinellus</i>	Least Concern	Schedule IV
11 Greater Flamingo	<i>Phoenicopterus roseus</i>	Least Concern	Schedule II
12 Green Sandpiper	<i>Tringa ochropus</i>	Least Concern	Schedule IV
13 Green Warbler	<i>Phylloscopus nitidus</i>	Least Concern	Schedule IV
14 Greenish Warbler	<i>Phylloscopus trochiloides</i>	Least Concern	Schedule IV
15 Hume's Leaf-warbler	<i>Phylloscopus humei</i>	Least Concern	Schedule IV
16 Marsh Sandpiper	<i>Tringa stagnatilis</i>	Least Concern	Schedule IV
17 Montagu's Harrier	<i>Circus pygargus</i>	Least Concern	Schedule I
18 Northern Pintail	<i>Anas acuta</i>	Least Concern	Schedule II
19 Olive-backed Pipit	<i>Anthus hodgsoni</i>	Least Concern	Schedule IV
20 Paddyfield Warbler	<i>Acrocephalus agricola</i>	Least Concern	Schedule IV
21 Red-breasted Flycatcher	<i>Ficedula parva</i>	Least Concern	Schedule IV
22 Richard's Pipit	<i>Anthus richardi</i>	Least Concern	Schedule IV
23 Rosy Starling	<i>Pastor roseus</i>	Least Concern	Schedule IV
24 Siberian Stonechat	<i>Saxicola maurus</i>	Not Listed	Schedule IV
25 Tawny Pipit	<i>Anthus campestris</i>	Least Concern	Schedule IV
26 Tickell's Thrush	<i>Turdus unicolor</i>	Least Concern	Schedule IV

²⁹

<https://ebird.org/barchart?byr=2001&eyr=2023&bmo=1&emo=12&r=L1157512,L14765610,L4277454,L7109375,L5055708,L14905928,L3135946,L14905526,L1909762,L14875105,L21972281,L14878242,L17257710,L4288465,L14602229,L6755235,L4016566,L22171920>

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S.N.Common English Name	Binomial Scientific Name	IUCN Red List – Categories	Wildlife (Protection) Act – Schedules
27 Verditer Flycatcher	<i>Eumyias thalassinus</i>	Least Concern	Schedule IV
28 Western Yellow Wagtail	<i>Motacilla flava</i>	Least Concern	Schedule IV
29 Wood Sandpiper	<i>Tringa glareola</i>	Least Concern	Schedule IV

Source: <https://ebird.org>

Table 4-18 Raptors reported from the region

S.N.	Common English Name	Binomial Scientific Name	Migrant (M) / Resident IUCN Red List – Categories I	WildLife (Protection) Act – Schedules
1	Black Kite	<i>Milvus migrans</i>	R	Least Concern Schedule II
2	Black-winged Kite	<i>Elanus caeruleus</i>	R	Least Concern Schedule II
3	Bonelli's Eagle	<i>Aquila fasciata</i>	R	Least Concern Schedule I
4	Changeable Hawk-Eagle	<i>Nisaetus cirrhatus</i>	R	Least Concern Schedule I
5	Montagu's Harrier	<i>Circus pygargus</i>	M	Least Concern Schedule I
6	Peregrine Falcon	<i>Falco peregrinus</i>	R	Least Concern Schedule I
7	Shikra	<i>Accipiter badius</i>	R	Least Concern Schedule I
8	Spotted Owlet	<i>Athene brama</i>	R	Least Concern Schedule IV

Source: <https://ebird.org>

4.4.3.2 Habitat Survey

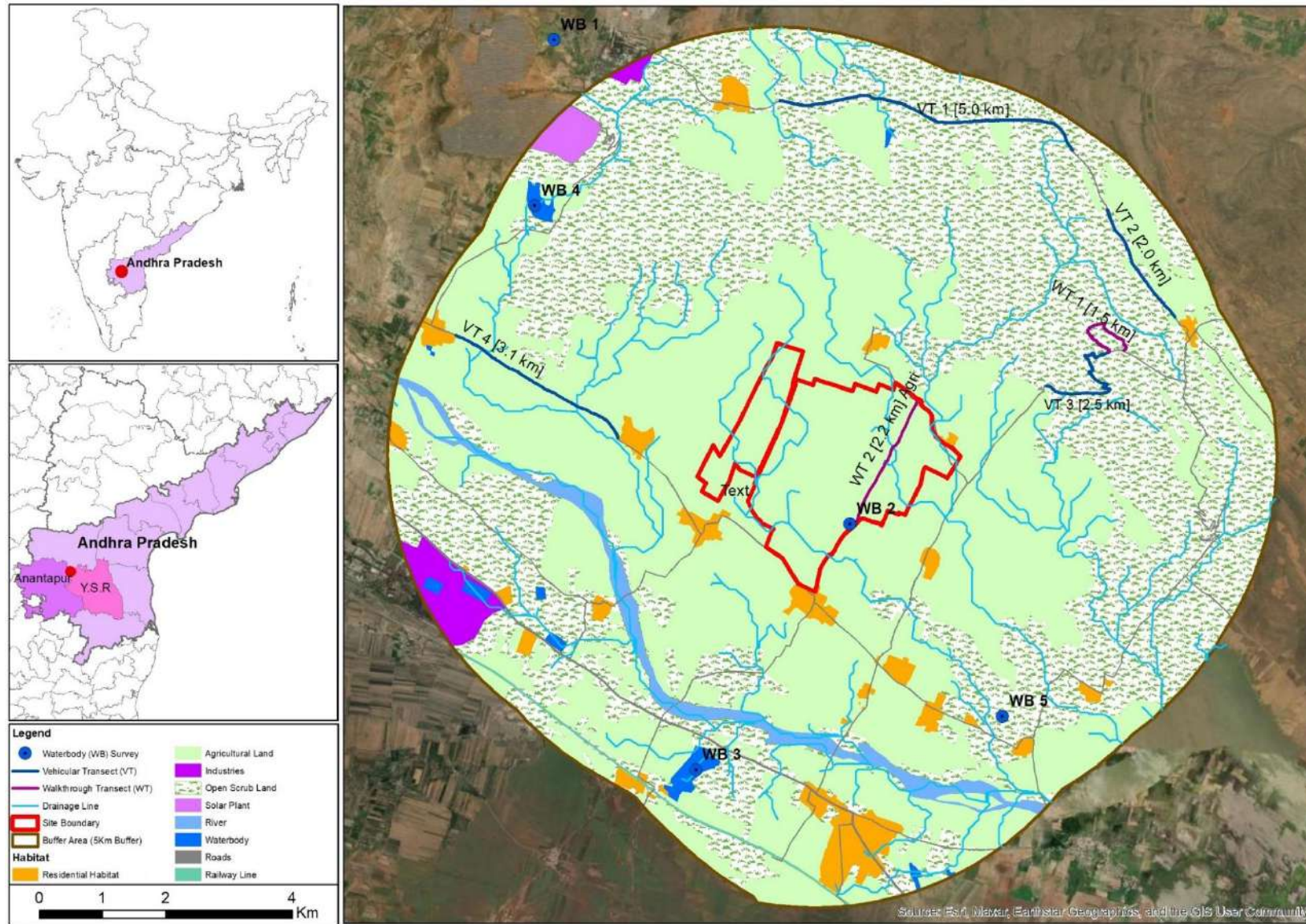
In the literature review, different habitats within the study area, were identified with the help of google earth satellite imagery. These habitats were verified in the reconnaissance survey during site visit. The study area consists of natural habitats (scrub land, river, and water bodies), and modified habitats (agricultural land, existing solar plants, and human residential areas). The distribution of identified habitats within the study area can be seen in **Figure 4:31**. Photographs of these habitats have been presented in Figure 4:32. The area covered by different habitats in the study area has been provided in **Table 4-19**. Among the natural habitats, scrub land is the dominating one with 60.84 km² area (42.65%); while the modified habitat – agricultural land cover about 71.18 km² (49.89%) of the total land.

Table 4-19 Area covered by different habitats in the study area

Natural Habitats	Area covered		Modified Habitats	Area covered	
	km ²	%		km ²	%
Scrub Land	60.84	42.65	Agricultural Land	71.18	49.89
River	2.62	1.83	Residential Area	3.45	2.42
Waterbody	0.84	0.59	Roads	1.57	1.10
			Industries Land	1.33	0.93
			Solar Plant	0.59	0.41
			Railway Line	0.23	0.16

Source: Survey of India topo sheet map

Figure 4:31 Distribution of habitats in the study area



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Figure 4:32 Habitats in the study area



River



Water Body



Scrub Land



Agriculture Land

4.4.3.3 Floral Survey

4.4.3.3.1 Vegetation Profile

As per the available information, the proposed project is coming on the Deccan Peninsula – Deccan South (6E) Biogeographical Province of India³⁰; Deccan plateau (Hot, Arid eco-region with mixed red and black soils) Agro-ecological Region³¹ and Southern Plateau and Hills region (X) Agro-Climatic Region³². The vegetation of the region may be defined as Southern Tropical Dry Deciduous Forests (5A) and Southern Tropical Thorn Forests (6A) according to forest classification of Champion and Seth (1968)³³.

4.4.3.3.2 Floral Diversity

The floral diversity present within the project boundary and 5 km buffer areas was assessed during the site survey. A total of fifty-nine (59) floral species belonging to twenty-three (23) families were observed from the 5 km radius of the project area. Fabaceae was the most dominating family in the area with 16 species. None of the species identified in the region is threatened and/or restricted range species. A list of encountered floral species with their families and life forms has been given in **Appendix 16**.

³⁰ <http://wiienvs.nic.in/database/htmlpages/bioprovincemap.htm>

³¹ Mandal D.K., Mandal C. and Singh S.K. (2015) *Delineating Agro-Ecological Regions*. ICAR-NBSSLUP technology, p. 8.

³² http://apps.iasri.res.in/agridata/19data/chapter1/db2019tb1_2.pdf

³³ Champion H.G. and Seth S.K. (1968) *A Revised Survey of Forest Types of India*. Govt. of India Press, New Delhi, p. 404.

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4.4.3.4 Faunal Survey

4.4.3.4.1 Herpetofauna

As per the literature review^{34,35}, local consultation and field survey, eighteen (18) herpetofauna (reptiles + amphibians) species were reported / observed from the study area. None of the species was categorized under any threatened category of the IUCN Red List (Online Version 2024-1); but three species [Bengal Monitor Lizard (*Varanus bengalensis*), Indian Rock Python (*Python molurus*) & Red Sand Boa (*Eryx johnii*)] were Near Threatened. Six species, Bengal Monitor Lizard, Indian Rock Python, Indian Cobra, Russell's Viper, Oriental Ratsnake, & Red Sand Boa were listed under the Schedule I category as per the Wildlife (Protection) Act, 1972 (**Appendix 17**).

4.4.3.4.2 Avifauna (Birds)

Based on the field survey conducted in the study area, a total of 66 avifaunal species were observed, which include one Vulnerable [River Tern (*Sterna aurantia*)] and two Near Threatened [Black-headed Ibis (*Threskiornis melanocephalus*), & Oriental Darter (*Anhinga melanogaster*)] species as per IUCN Red List (Online Version 2024-1). Three (03) Schedule I species – Eurasian Spoonbill (*Platalea leucorodia*), Indian Peafowl (*Pavo cristatus*), & Shikra (*Accipiter badius*) were also observed from the area as per the Wildlife (Protection) Act, 1972. Two raptors [Black-winged Kite (*Elanus caeruleus*) & Shikra (*Accipiter badius*)] were also observed in the study area. As the survey was conducted in the non-migratory season, no migratory bird was observed. A comprehensive list of the observed species along with their corresponding IUCN status and Schedule status has been provided in **Appendix 18**.

4.4.3.4.3 Mammals

As per the literature review^{36,37}, local consultation and field survey, fifteen (15) mammals were recorded (reported / observed) from the study area, which include one Vulnerable [Bonnet Macaque (*Macaca radiata*)] and one Near Threatened [Tufted Grey Langur (*Semnopithecus priam*)] species as per IUCN Red List (Online Version 2024-1). Six species [Bengal Fox (*Vulpes bengalensis*), Blackbuck (*Antelope cervicapra*), Golden Jackal (*Canis aureus*), Indian Crested Porcupine (*Hystrix indica*), Indian Wolf (*Canis lupus pallipes*), & Jungle Cat (*Felis chaus*)] were listed under the Schedule I category as per the Wildlife (Protection) Act, 1972 (**Appendix 19**).

4.4.3.5 Protected and Key Biodiversity Areas

There is no protected area³⁸ as well as Important Bird and Biodiversity Area (IBA)³⁹ within the proximity of 10 km. The nearest protected area, Rajiv Gandhi National Park, is situated approximately 46 km east-southeast from the project site, while the closest IBA, Sri Lankamalleswaram Wildlife Sanctuary, lies approximately 73 km in the same direction. Dobbudapalle Reserve Forest is located about 2 km from the project boundary in Northeast direction. Additionally, the Nallamala Forest range is located about 56 km east, Gundla Brahmeswaram Wildlife Sanctuary is about 81 km in northeast, and GIB Rollapadu Wildlife Sanctuary is about 91 km in north-northeast directions from the project site (**Figure 4:33**).

Dobbudapalle Reserve Forest: Dobbudapalle Reserve Forest is located about 2 km from the project boundary in Northeast direction on the hillocks. Broadly, it represents Southern Tropical Thorn Forests (6A) according to forest classification of Champion and Seth (1968). The forest type may be further subdivided in to Southern Thron Scrub (6A/C1/DS1). The general floristics of these reserve consist of *Abutilon indicum* (L.) Sweet, *Azadirachta indica* A.Juss., *Calotropis gigantea* (L.) Dryand., *Carissa carandas* L., *Euphorbia antiquorum* L., *Euphorbia caducifolia* Haines, *Hardwickia binate* Roxb., *Lantana camara* L., *Solanum pubescens* Willd., *Zyzyphus* spp. and *Heteropogon contortus* (L.) P.Beauv. ex Roem. & Schult. Bengal Monitor Lizard, Indian Rock Python, Ashy-crowned Sparrow-lark, Black Drongo, Black-winged Kite, Eurasian Collared-Dove, Grey Francolin, Jungle Prinia, Rufous-tailed Lark, Bengal Fox, Blackbuck, Indian Grey Mongoose, and Indian Hare are the common faunal representatives from this reserve.

³⁴

https://www.inaturalist.org/observations?lat=14.88982707726986&lng=78.11448967004726&place_id=any&radius=51.42143816537571&subview=map&view=species&iconic_taxa=Reptilia,Amphibia

³⁵ Forest Working Plan of Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division.

³⁶

https://www.inaturalist.org/observations?lat=14.88982707726986&lng=78.11448967004726&place_id=any&radius=51.42143816537571&subview=map&view=species&iconic_taxa=Mammalia

³⁷ Forest Working Plan of Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division.

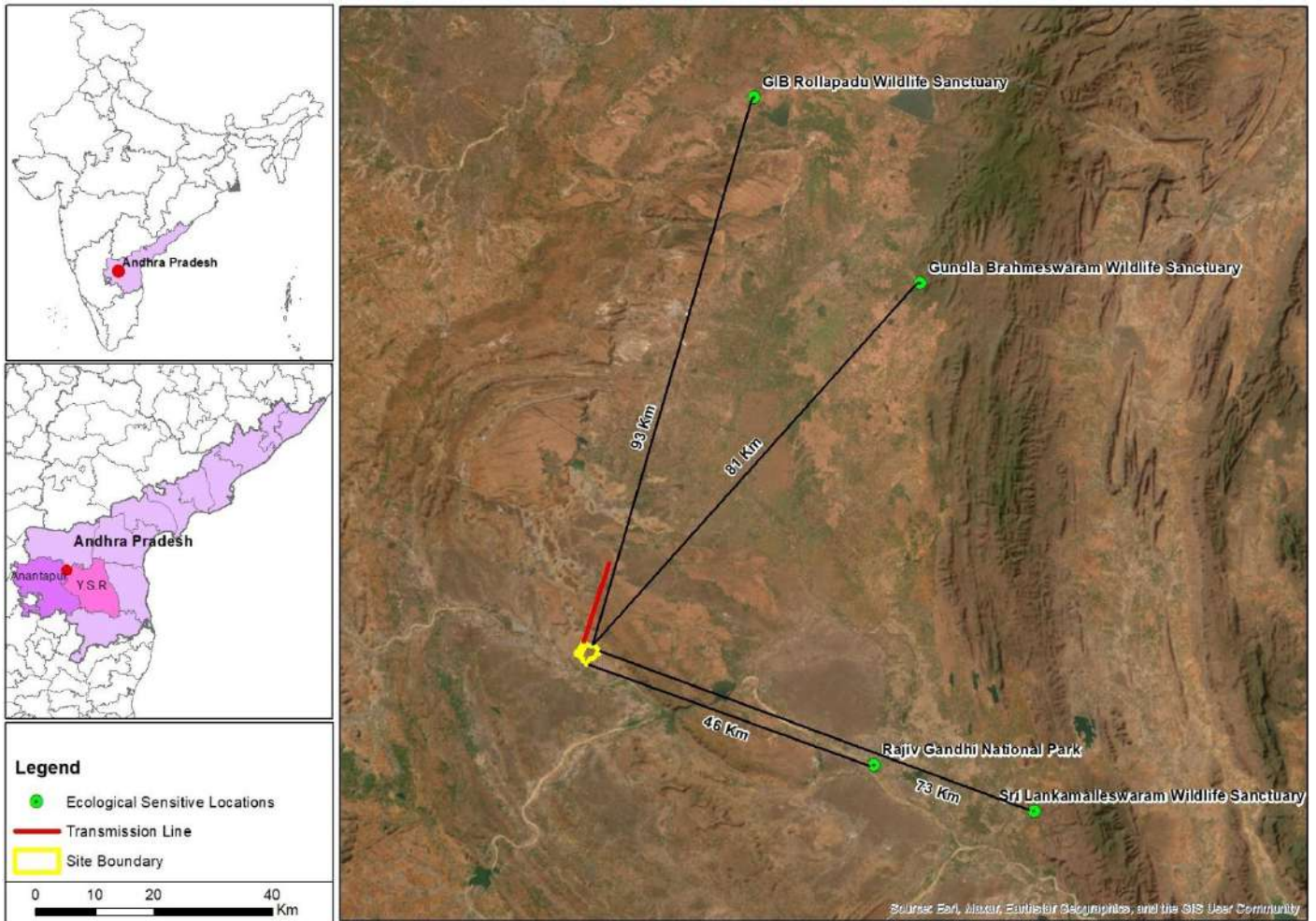
³⁸ http://wiienvs.nic.in/Database/Maps_PAs_1267.aspx

³⁹ Rahmani A.R., Islam M.Z. and Kasambe R.M. (2016) *Important Bird and Biodiversity Areas in India: Priority Sites for Conservation (Revised and updated)*. Bombay Natural History Society, Indian Bird Conservation Network, Royal Society for the Protection of Birds and BirdLife International (U.K.), p. 1992 + xii.

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Figure 4:33 Ecological Sensitivity around the proposed site



4.4.3.6 Bird Migration Flyways

India majorly lies in the Central Asian Flyway⁴⁰ (Figure 4:34). More than 300 species travel along the Central Asian Flyway, including a significant movement of the family Anatidae (Ducks, Geese and Swan), Gruidae (Cranes), etc. that travel from Europe/North Asia to the Indian subcontinent and occupy medium to large water bodies.

As per the historical data extracted from the eBird Database⁴¹, at least 29 migratory birds including one Schedule I [Montagu's Harrier (*Circus pygargus*)] species were reported from the region (~50 km radius from the project boundary) (Table 4-17). None of IUCN Threatened migratory species was recorded from the region.

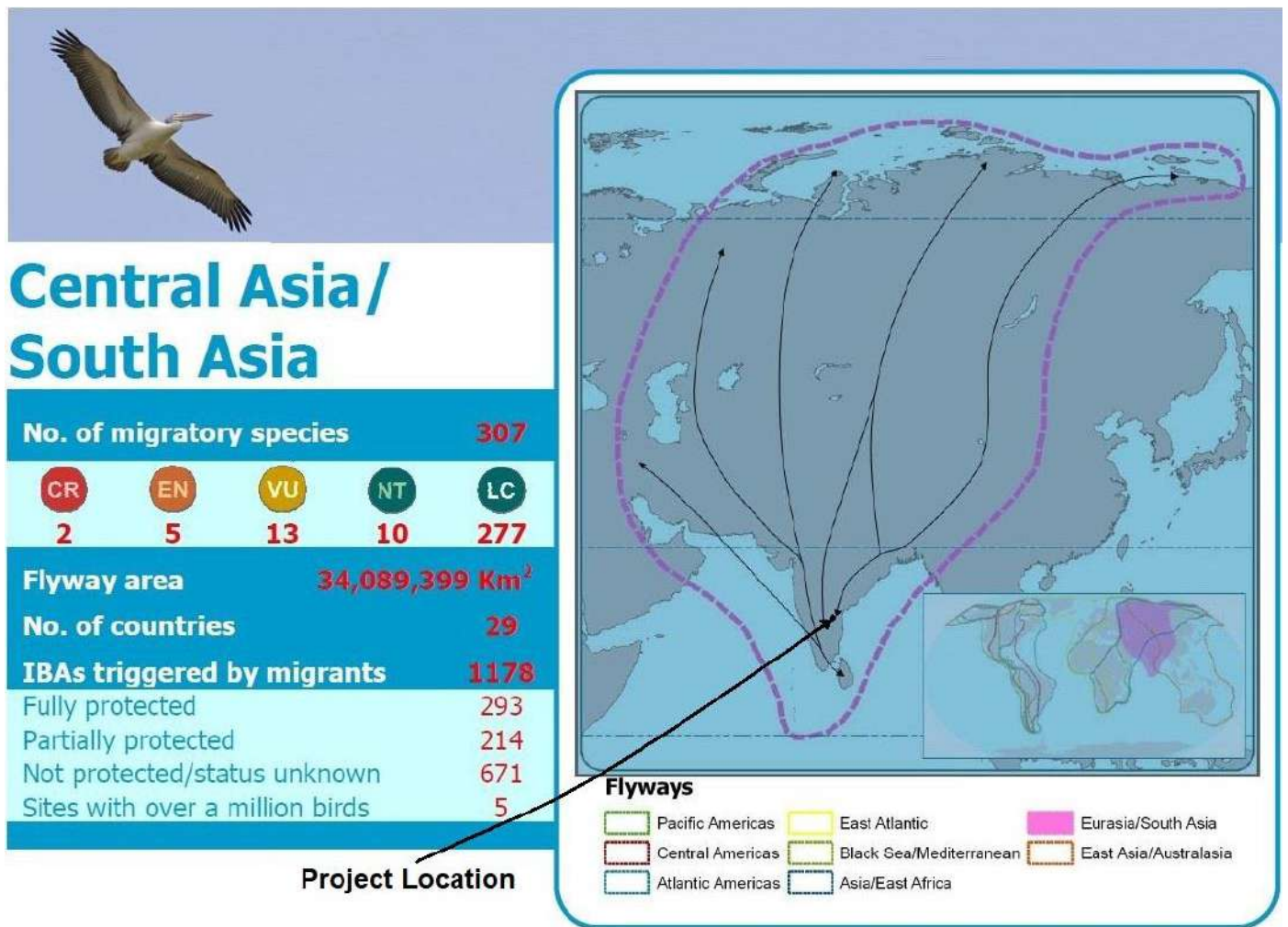
Although, number of seasonal and few perennial water bodies are present within the study area; but no significant congregation of migratory water birds has been reported from the study area (as per the available secondary information). However, to reduce the risk of collision and electrocution of migratory / congregatory and other birds, some mitigation measures have been suggested under section, 6.6 Impacts on Biological Environment.

⁴⁰ http://datazone.birdlife.org/userfiles/file/sowb/flyways/7_Central_Asia_Factsheet.pdf

⁴¹ <https://ebird.org/barchart?byr=2001&eyr=2023&bmo=1&emo=12&r=L14906187,L8899113,L13227474>

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Figure 4:34 Location of Project Site in the Central Asian Flyway



4.4.3.7 Critical Habitat Assessment

To understand the likelihood of critical habitat for the project, a Critical Habitat Screening was conducted and shared within the Screening and Scoping report (Dated: May 2024). In this screening, the Integrated Biodiversity Assessment Tool (IBAT) was used to identify threatened species likely to occur within or nearby the Project Area. Apart from IBAT, extensive publicly available documents and research materials were reviewed to identify additional sensitivities and finalize the checklist of species of conservation significance. Based on that exercise, a single species [Jerdon’s Courser (*Rhinoptilus bitorquatus*)] met the criteria (1 a, c; 2 a) to be screened-in for the Critical Habitat Assessment for the project’s EAAA.

An independent Critical Habitat Assessment study was conducted to evaluate the likelihood of Critical Habitat due to Jerdon’s Courser. The assessment involved a review of species-specific secondary data, local consultations, discussions with Divisional Forest Offices (at Kurnool, Ananthapuramu, and Proddatur divisions), and a primary survey. These efforts concluded that the screened-in species (Jerdon’s Courser) is absent in the EAAA. The report highlights the presence of Jerdon’s Courser in Sri Lankamalleswara Wildlife Sanctuary, YSR District (Kadapa), which is approximately 73 km away from the project location. There is also unlikelihood of criteria 4 and 5 to be trigger for the project’s EAAA. Therefore, there is unlikelihood of critical habitat for the project.

[For more details, please refer to independent Critical Habitat Assessment report.](#)

5 Stakeholder Identification and Engagement

Stakeholder engagement is an ongoing process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism and ongoing reporting to Affected Communities. Stakeholder Engagement is thus an umbrella term which encompasses a range of activities or interactions between a company and its internal and external stakeholders, through the life of the project.

The subsequent sections sheds light on the parameters of identification of and engagement with key stakeholders, in order to assess the impact of the project on them.

Based on the stakeholder analysis, mapping and consultation conducted as part of ESIA, an SEP and GRM for the project has been developed. The SEP is aimed to managing and facilitating future engagement activities with identified stakeholder through the various stages of the project's lifecycles (construction and operation). The primary purpose the plan is to also for the Project development to be undertaken in a manner that is consistent with the principle of information disclosure and stakeholder engagement of AIIB.

5.1 Stakeholder Identification and Characterisation

A Stakeholder is "a person, group, or organisation that has a direct or indirect stake in a project/organisation because it can affect or be affected by the Project/organisation's actions, objectives, and policies". Stakeholder thus vary in terms of degree of interest, influence and control they have over the project. While those stakeholders who have a direct impact on or are directly impacted by the project are known as Primary stakeholders, those who have an indirect impact or are indirectly impacted are known as Secondary Stakeholders. Keeping in mind the nature of the project and its setting, the stakeholders have been identified and listed in **Table 5-1**

Table 5-1 Stakeholder Group Categorization

Category	Primary Stakeholder	Secondary Stakeholders	Remarks
Community	<ul style="list-style-type: none"> Local community Opinion Holders Community Leaders 	Nil	<ul style="list-style-type: none"> Consultation with the primary stakeholders has been undertaken during the site visit.
Vulnerable groups	<ul style="list-style-type: none"> Schedule Caste Schedule Tribe Women members (including vulnerable women) Childrens Disabled Individual Older people Poor / Low Income group 	Nil	<ul style="list-style-type: none"> As part of the consultation with local community, consultation with SC has been undertaken. As reported by the local community, no ST community is present in the Koduru Village. Consultation was carried out with Women community members. Detailed Consultation with all the vulnerable group members during the preparation of the Livelihood Restoration Plan (LRP)
Institutional Stakeholders	<ul style="list-style-type: none"> New & Renewable Energy Development Corporation Of A.P. Ltd. (NREDCAP) Andhra Pradesh Solar Power Corporation Pvt Ltd (APSPCL) Andhra Pradesh Power Generation Corporation (APGENCO) District Revenue Department⁴² Local gram Panchayats Project Investors 	<ul style="list-style-type: none"> Village Institutions (education and health department) Political Parties 	<ul style="list-style-type: none"> As part of the institutional stakeholders' consultation, consultation with APG and Revenue Department has not been able to undertake as the representatives were not available at the time of the site visit. Nevertheless, consultations with the other key institutional stakeholders have been successfully conducted as part of the ESIA preparation engagement.
Government Bodies	<ul style="list-style-type: none"> District Administration Regulatory Authorities (Labour and environment) 	<ul style="list-style-type: none"> State Administration 	<ul style="list-style-type: none"> During the preparation of ESIA studies, no consultation with respective government bodies has been undertaken. As the consultation with these government bodies will be undertaken by a project during the construction and operation phase.

⁴² District Revenue Department, is the land governing authority

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Category	Primary Stakeholder	Secondary Stakeholders	Remarks
Other Groups	<ul style="list-style-type: none"> Employees Land Aggregator Contractors and sub-contractors Suppliers Contractual workers 	<ul style="list-style-type: none"> Media Local and national NGOs – environmental organizations and CSOs 	<ul style="list-style-type: none"> During the preparation of ESIA studies, no consultation with respective other groups has been taken, except land aggregator. As the consultation with these groups will be undertaken by a project during the construction and operation phases. Further, according to the information provided by the local community and an examination of available secondary data, it has been determined that there are no civil society organizations (CSO) operating within the study area. Consequently, there have been no consultations or engagements conducted with such organizations as part of the Environmental and Social Impact Assessment (ESIA) process

5.2 Stakeholder Mapping

“Stakeholder mapping” is a process of examining the relative influence that different individuals and groups have over a project as well as the influence of the project over them. The purpose of stakeholder mapping is to:

- Identify each stakeholder group
- Study their profile and the nature of the stakes
- Understand each group’s specific issues, concerns as well as expectations from the project
- Gauge their influence on the project

Based on such an understanding the stakeholders are categorised into high influence, medium influence, and low influence.

The stakeholder engagement starts in the early stages of the project, also needs to be included in the impact assessment and risk identification process and continues across the life cycle of the Project. The stakeholder analysis also shapes the stakeholder engagement strategy for the project and needs to be continuously update the stakeholder analysis and helps in integrating the impacts and risk identified in the Project designing and during the implementation stages to help the company better addresses the associated impacts with the project.

5.3 Stakeholder Analysis

The influence and priority have both been primarily rated as:

- High Influence:** This implies a high degree of influence of the stakeholder on the project in terms of participation and decision making or high priority to engage with the stakeholder
- Medium Influence:** Which implies a moderate level of influence and participation of the stakeholder in the project as well as a priority level to engage the stakeholder which is neither highly critical nor are insignificant in terms of influence
- Low Influence:** This implies a low degree of influence of the stakeholder on the project in terms of participation and decision making or low priority to engage that stakeholder

The intermediary categories of low to medium or medium to high primarily imply that their influence and importance could vary in that particular range subject to context specific conditions or also based on the responses of the project towards the community.

The coverage of stakeholders as stated above includes any person, group, institution or organization that is likely to be impacted (directly or indirectly) or may have interest/influence over project. Keeping this wide scope of inclusion in stakeholder category and the long life of project, it is difficult to identify all potential stakeholders and gauge their level of influence over project at the outset of the project. Therefore, the project proponent is advised to consider this stakeholder mapping as a live document which should be revised in a timely manner so as to make it comprehensive for any given period of time.

The following table provides a brief profile of the stakeholder groups identified, their key interests and concerns and the way they may be involved in the project lifecycle

Table 5-2 Profile of stakeholder identified, interests and concerns and involvement in Project

Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
Primary Stakeholders					
Local Community	The project site falls within the Village Koduru and 8 revenue villages falls within study area of 5 km radius namely Bodaipalle, K Sirige Palle, Nandipadu, Shotrium Chennampalle, Thimmanayunipeta, Thollamadugu, Ummaipalle and Uruchinthala.	<p>The expectations and concern of this group from the project:</p> <ul style="list-style-type: none"> Receiving benefits from the project in terms of employment and development of infrastructure and the community. Project and its workers (including on-roll and contractual) should be sensitive to the cultural and social aspects of the local community. This may involve respecting local traditions, minimal to no interactions with women at the village, or minimizing disruption to community life. 	<ul style="list-style-type: none"> The stakeholder group may have a significant role to play in the public opinion formation towards the project. The stakeholder will be the direct receptors of migrant workers. The workers will use the village's market to purchase their basic necessity things. The villagers involved in supplying water through tankers, will be contractors for the project during the construction phase. The villagers will be the direct receptor of traffic movement for transportation of raw material during the construction phase of the project. 	<ul style="list-style-type: none"> The project can prove to be potential employer of the people in the area. The need-driven CSR activities can play the critical role in the development of the community through economic opportunities and CSR projects. 	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH / MEDIUM Influence of Project: HIGH / MEDIUM
Vulnerable Groups	This group comprises of those groups/households considered to be vulnerable due to their social, political, or economic status in society. However, based on the understanding of the project and its activities the vulnerable groups are not likely to be severely impacted due to the project activities. This stakeholder will also be considered as part of the local community	<p>The expectations and concern of this group from the project:</p> <ul style="list-style-type: none"> Receiving benefits from the project in terms of employment and development of infrastructure and the community; and Project and its workers (including on-roll and contractual) should be sensitive to the cultural and social aspects of the local community. This may involve respecting local traditions, minimal to no interactions with women at the 	This group shall be considered as being part of a local community. Thus, the similar influence is considered for the group.	The project may play a critical role in the development of these groups, by identifying specific opportunities and programmes for the groups	<ul style="list-style-type: none"> Influence of Stakeholder: LOW Influence of Project HIGH/ MEDIUM

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Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
		village, or minimizing disruption to community life.			
Women groups and vulnerable women, Older people, Children and Disabled Individuals	Women in the community are essential stakeholders whose insights and needs significantly influence project outcomes. Historically marginalized, their voices have often been overlooked, particularly vulnerable women who face additional barriers due to societal norms and economic dependence. The elderly population, reliant on social support and services, will be consulted to address their specific needs and assess the project's impact on their livelihoods and well-being. Individuals with disabilities are also vital stakeholders, and efforts will focus on adapting communication methods and ensuring accessibility during consultations to gather their insights effectively. Lastly, children's rights and interests will be prioritized, with SAEL engaging families and community leaders to ensure that their voices are heard and that their safety and well-being are upheld throughout the project's implementation.	<p>The expectations and concerns of these stakeholder groups from the project include:</p> <ol style="list-style-type: none"> Women Groups and Vulnerable Women: Concerns include the potential for continued marginalization and the lack of support for economic empowerment initiatives. Seeking assurances that project benefits will be equitably distributed and that initiatives will actively promote gender equality. Gender Based Violence: Gender-based violence (GBV) is a critical issue that can significantly impact stakeholder analysis in various contexts and therefore need to be addressed from the project perspective. Older People: This group expects the project to consider their specific needs, particularly regarding access to resources, healthcare, and social support. Disabled Individuals: They expect an inclusive engagement process that accommodates their needs and perspectives. Children: Their concerns include the potential negative impacts on their safety, education, and well-being. 	This group shall be considered as being part of a local community. Thus, the similar influence is considered for the group.	The project may play a critical role in the development of these groups, by identifying specific opportunities and programmes for the groups	<ul style="list-style-type: none"> Influence of Stakeholder: LOW Influence of Project HIGH/MEDIUM

Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
Opinion Holders and Community Leaders	This stakeholder group is comprised of those individuals of the local community who hold traditional and rational power. These stakeholder group members include the elders, community and political leaders in the village and play a critical role in the decision making in the local community	<p>The expectations and concerns of this group from the project includes:</p> <ul style="list-style-type: none"> Receiving benefits from the project in terms of employment and development of infrastructure and the community. Regular updates on the project activities and the opportunities from the same; and Project and its workers (including on-roll and contractual) should be sensitive to the cultural and social aspects of the local community. This may involve respecting local traditions, minimal to no interactions with women at the village, or minimizing disruption to community life. 	This group is powerful enough to affect the functioning of the Project in their vicinity and may play an important role in the public opinion formation, implementation of the CSR activities planned by the project.	These groups due to their social status, may already have access to several economic benefits from other Projects, and thus may not be completely dependent upon the Project for access to development opportunities	<ul style="list-style-type: none"> Influence of Stakeholder: MEDIUM Influence of Project: MEDIUM
Local Gram Panchayats	This stakeholder group is comprised of the lowest level of local governance. The gram panchayats consist of one or more revenue villages and are the lowest level of decision-making bodies for development activities in the villages	<p>The expectations and concerns of this group from the project:</p> <ul style="list-style-type: none"> Receiving benefits from the project in terms of employment and development of infrastructure; Implementation of community development programmes in consultation with the Gram Panchayat and the local community; Preference to the local community in contractor and employment 	<ul style="list-style-type: none"> This stakeholder group is crucial in the smooth functioning of the project. The panchayat members can influence the decision-making process of the landowners and the entire community, at large; and This stakeholder may also play an important role in the implementation CSR activities planned and the execution of other plans such as stakeholder engagement and grievance management. 	The project can play an important role in the development of the villages by undertaking CSR activities in collaboration with the Gram Panchayat, especially in areas where there is a paucity of government funds	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH Influence of Project: MEDIUM

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Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
		<p>opportunities from the project; and</p> <ul style="list-style-type: none"> Regular updates on the project activities and the opportunities from the project. 			
Regulatory Authorities	This stakeholder group is comprised of the central, state and district level regulatory authorities. These authorities influence the project in terms of establishing policy, granting permits and approvals for the project, monitoring, and enforcing compliance with the applicable rules and regulations	<p>The key expectations and concerns of the group from the project include:</p> <ul style="list-style-type: none"> Project's compliance to the regulatory requirements; and Timely disclosure of information and provisioning of updated through the life of the project. 	<ul style="list-style-type: none"> The failure of the project to comply with the various rules and regulations applicable can affect the timely implementation of the project This stakeholder group is also critical for various permits/clearances required for the commissioning of the project 	The influence of the project on the stakeholders pertains to the role the project will play in the development of the Project in the area	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH Influence of Project: LOW
District Administration	This stakeholder group is comprised of the government bodies at the district level. These bodies are vested with funds and decision-making process. Accordingly, the bureaucracy, the Block Development Officers, Block Health Officers, Tehsildar, Patwari, and Revenue Officer have become extremely influential.	<p>The key expectations and concerns of the group from the project include:</p> <ul style="list-style-type: none"> Project's compliance to the regulatory requirements; and Timely disclosure of information and provision of updates throughout the life of the project. 	<ul style="list-style-type: none"> This stakeholder group is critical for the obtaining of the various permits/clearances required for the commissioning of the project and its smooth functioning. This group serves as important point of contact between the state level authorities and the local community 	The influence of the project on the stakeholders pertains to the role the project will play in the development of the study area.	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH Influence of Project: LOW
Land Aggregator	SAEL had appointed M/s Saffrongrid Limited as a land aggregator for the proposed Solar power project, the land aggregator facilitates the land leasing process and ensure compliances of the applicable legal requirement	<p>The key expectations and concerns of the group from the project include:</p> <ul style="list-style-type: none"> Clarity in terms of scope of work, expectations, key performance indicators and timelines 	<ul style="list-style-type: none"> This stakeholder group is critical for the smooth functioning and timely implementation of the project. This group may also play an important role in the formation of public opinion towards the project 	The influence of the project on the group pertains to the role of the project in business opportunities and the process of contract closure	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH Influence of Project: HIGH

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Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
	involved in sourcing the land for the project.	<ul style="list-style-type: none"> Timely and adequate disclosure of information to allow the project activities to be carried out fair business opportunities and contract closure business continuity			
Contractors and Sub-Contractors	This stakeholder group comprises of Land Aggregator, EPC and O&M contractors and other contractor or suppliers for providing goods and services that will be appointed by the Project for various stages.	The primary concerns and expectations of the group from the project include: <ul style="list-style-type: none"> The role of the project in continued economic opportunity and work generation. Avoidance of any reputational risks associated with the project due to any future community unrest or project activities Clarity in terms of scope of work, expectations, key performance indicators and timelines Timely supply of goods and services Quality issues among the goods and services provided Timely and adequate disclosure of information to allow the project activities to be carried out fair business opportunities and contract closure business continuity. 	<ul style="list-style-type: none"> This stakeholder group is critical for the smooth functioning and timely implementation of the project. This group may also play an important role in the formation of public opinion towards the project Delay in project implementation due to failure of supply within the timeline 	The influence of the project on the group pertains to the role of the project in business opportunities and the process of contract closure	<ul style="list-style-type: none"> Influence of Stakeholder: HIGH Influence of Project: HIGH
Permanent Contractual workers	This group is comprised of skilled and semi-skilled and unskilled workers, involved in the project on	The primary concerns and expectations of the stakeholder group pertaining to the project is as follows:	<ul style="list-style-type: none"> This stakeholder group is critical for the smooth functioning and timely implementation of the project. 	The influence of the project on the group pertains to the roles of the project in the	<ul style="list-style-type: none"> Influence of Stakeholder: MEDIUM

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Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
	a permanent and contractual basis. This group is most likely to be comprised of the semi-skilled workers involved in the construction work of the project. As reported by the project the first preference of the project is to appoint local workers.	<ul style="list-style-type: none"> The role of the project in continued economic opportunity, work generation and a source of income. Timely settlement of dues and payments in keeping with the legal requirements Continued work opportunities Safety at work. 	<ul style="list-style-type: none"> This group may also play an important role in the formation of public opinion towards the project 	continuance of economic opportunities, timely payment of wages and ensuring the health and safety of the workers	<ul style="list-style-type: none"> Influence of Project: HIGH
Secondary Stakeholders					
Village Institutions	This stakeholder group is comprised of health and education institutions at the village level. The institutions in the immediate vicinity of the project are the government primary schools in the villages.	<p>The main concerns and expectations of the group from the project pertain to:</p> <ul style="list-style-type: none"> Adequacy of community development activities in the area Contribution of project towards the overall development of the area Involvement in the formulation and implementation of the community development activities Timely and adequate disclosure of information pertaining to the project. 	The influence of the group on the project pertains to the role of the played by these institutions in the opinion formation and implementation of community development programs and CSR activities.	The influence of the project on the group pertains to the role of the project in the development of these institutions.	<ul style="list-style-type: none"> Influence of Stakeholder: LOW Influence of Project: MEDIUM
Political Parties	This stakeholder group is comprised of political parties, which are active in the area. This group plays a critical role in the sensitization of the population and the creation of the public opinion.	<p>The key expectations and concerns of the group from the project include:</p> <ul style="list-style-type: none"> The role of the project in the overall development of the area The impact of the project on the local community Adequate community development activities throughout the life of the project 	The influence of his stakeholder group in the project pertains to the role of the political parties in the formulation of public opinion towards the project.	The influence of the projects on the group is expected to be extremely limited, pertaining to the role of the project in the development of the area.	<ul style="list-style-type: none"> Influence of Stakeholder: MEDIUM Influence of Project: LOW

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Relevant Stakeholders	Profile	Key concerns and feedback provided by the stakeholder group	Influence of Stakeholder on Project	Influence of Project on Stakeholder	Influence Rating
		<ul style="list-style-type: none"> Timely disclosure of information pertaining to the project activities. 			
State Administration	The state administration is comprised of the state level agencies of the various departments/authorities such as industries department, revenue department, labour department and land department etc.	<p>The main expectations and concerns of the stakeholder group from the project include:</p> <ul style="list-style-type: none"> Compliance to the regulatory requirements for the project Project's role in the development of the area Timely disclosure of information pertaining to the project activities 	This stakeholder group is also critical for the obtaining of the various permits/clearances required for the commissioning of the project	The influence of the project on the stakeholders pertains to the role the project will play in the development of solar energy in the state	<ul style="list-style-type: none"> Influence of Stakeholder: MEDIUM Influence of Project: LOW
Media	The media, comprising of both print and visual media, has a presence in the district. They are known to have an extremely important role in generation awareness amongst the community.	<p>The main expectations and concerns of the stakeholder from the project include:</p> <ul style="list-style-type: none"> Compliance to the regulatory requirements for the projects Project's role in the development of the area Maintenance of positive relationship with the local community and other stakeholder Timely disclosure of information regarding the project activities 	The influence of the stakeholder group on the project is likely to pertain to the opinion formation amongst other stakeholders towards the project	The influence of the project on the stakeholder is likely to be extremely limited due to the nature of the project activities.	<ul style="list-style-type: none"> Influence of Stakeholder: LOW Influence of Project: LOW

5.4 Consultation undertaken during site visit.

Consultation with the stakeholders to understand the project description, land procurement process, solar plant specification, project's resource requirement, project's proposed activities, social and environmental management plan and safeguards, socio-economic profile of local community, etc. provides the details of the brief consultation undertaken during the site visit.

Table 5-3 Consultation undertaken during the site visit

Sr. No.	Stakeholder Details	Objective of the consultation	Criteria for selecting and determining consultation with the stakeholders
1.	Project – Human Resource Representative	<p>Discuss the human resource processes and safeguards:</p> <ul style="list-style-type: none"> • Process of appointment of any employee • Process of appointment of human resource providing contractual workers and their compliance checks • Process of providing induction to newly appointed employees (on-roll and contractual workers) • HR related policies, SOPs and commitment, and other labour welfare commitments • Internal HR related audit procedure • Safeguards available for women to protect them against GBVH and SAE • Stakeholder Engagement Procedure • Grievance Redressal Mechanism • Appointment of security guards providing contractors and training procedure for security guards • Proposed number of employees (on-roll and contractual) for the Project 	The stakeholder is critical to understand the HR policy planned for the project and strategies to meet the compliance with the applicable reference framework of this report in reference to workers' working conditions and terms of employment
2.	SAEL	<p>Discussion on:</p> <ul style="list-style-type: none"> • 300MW solar plant specification • Development of common infrastructure • Transmission of electricity from project to polling substation • Development of polling substation • Land allotment process • Any legacy issues on allotted land • Current status of the project 	The stakeholder is responsible for implementing the project.
3.	Local Community (in-depth interview) Koduru Village	<p>Discussion on (but not limited to):</p> <ul style="list-style-type: none"> • Socio-economic profile • Project overview • Key expectation from projects • Availability of water infrastructure • Key concerns from upcoming migrant workers • Welfare characteristics of communities • Living conditions 	The stakeholder is the nearest habituated local community from the proposed project boundary
4.	Divisional Forest Office, Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division	<p>Discussion on:</p> <ul style="list-style-type: none"> • Status of faunal diversity in and around the project site 	The stakeholder (Forest Department) is the only government body to hold on the Forest and Wildlife of the region which can help us to understand the

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Sr. No.	Stakeholder Details	Objective of the consultation	Criteria for selecting and determining consultation with the stakeholders
		<ul style="list-style-type: none"> Status of avifaunal (residential as well as migratory) movement in and around the project site Any statistical data / checklist of flora and fauna of the Range / Division Critical Habitat Assessment 	current and historical status of local ecology and biodiversity.
5.	Revenue Department	Discussion on <ul style="list-style-type: none"> Presence of Schedule-V Land or any land allotted by government for poor and vulnerable within the project land Whether any Assigned land was involved for the project Current market value of the land Process involved in Land Leasing and land use conversion, etc. were briefly discussed 	The Revenue Department is the custodian of Government lands and ensuring proper maintenance of land records and involves in Alienation and Acquisition of Government land / Private Land for bonafide public purposes to a person, institution or local body

5.5 Information Disclosure

Information disclosure is a crucial process that ensures transparency and stakeholder engagement in projects that may have significant environmental and social impacts. Effective information disclosure in ESIA not only enhances project acceptance but also contributes to sustainable development by ensuring that environmental and social considerations are integral to decision-making. Information disclosure is not only the regulatory requirements but also the lender's requirements. The process of disclosing the information to the relevant stakeholders involves the provisioning of the information in the accessible manner, in the language understandable i.e. publishing in the local language and place where accessible to all class of stakeholders. Information Disclosure not only builds trust on the project developer but facilitates the stakeholders to have a constructive participation on the decision-making process.

All relevant project related information shall be disclosed to the relevant stakeholders such as project timeline, employment opportunities, skill development programs if conducted, details on the community development programs initiated by the client, etc. Client can refrain the false claims or rumors spread among the community by way of providing valid or correct information to the community.

The disclosure on the outcome of the impact assessments and various plans developed for effective management of E&S issues which may arise due to the project development. The Client can make copies of the ESIA reports / Executive summaries and display the same at Panchayat Offices, community centers, etc. in the local language understandable by the community. Informing the stakeholders on the list of documents disclosed and the way to access those information shall be communicated to the stakeholders through stakeholder engagement activities.

5.6 Proposed stakeholder engagement activities

This section provides the stakeholder engagement plan for the Project lifecycle going forward. This engagement plan builds on the activities undertaken thus far, the existing relationship with the stakeholders and their expectations and the requirements of the AIIB ESPs. This section puts in place, the principle to be followed for stakeholder engagement through the project lifecycle, the methods that may be used and the engagement plan This section provides an overall plan for the entire project lifecycle and a detailed plan for the land procurement and other phases of the Project. This is a live document and will be reviewed and updated on a regular basis.

Principles of Engagement

The stakeholder engagement process is informed by a set of core values that determines consultation, negotiation, and grievance management. The stakeholder engagement and grievance redress for the Project will be based on the following principles:

Commitment	Transparency and Fairness	Trust and Respect	Accessibility and Cultural Appropriateness	Open and Inclusive Mechanism
Description				
It is established when the process of engagement is started early on during the Project. It is demonstrated when the need to understand, identify and engage with every member of the affected community is recognized and acted upon from the planning stage of the Project.	The Process for Grievance resolution shall be transparent, in harmony with the local culture, and in the appropriate language. It should explicitly assure potential users that the mechanism would not impede their access to other judicial or administrative remedies	Meaningful information is provided to create open dialogue in the local language format that is easy to understand and adaptable to local context. The SE process should respect the local traditions, values and interests of the stakeholders.	Every member of the community or groups should have access to the grievance procedure. To allow all stakeholders to have access to the mechanism, the grievance redressal will be published in the local language of the community	The process of communication will be two-way, giving both the Project and the stakeholder (s) opportunity to exchange views, opinions, to listen and have their issues heard and addressed. It should be inclusive in representation of views, and hence provide additional support to vulnerable groups (women, elderly, physically disable, minorities) to participate in the communication process

Methods of Engagement

The methods of engagement incorporate individual profiles. Concerns, and expectations of the groups. The need for different modes of engagement is necessary because the utilization of a common modes of engagement for all the stakeholders and for the whole project duration may result in the failure of the engagement process to achieving its intended goals. Therefore, the following methods have been identified for the purpose of this Project. In deciding the appropriate engagement method and frequency of such method used for the identified stakeholders, the following criteria has been considered:

- The acceptability of the engagement method
- The current level of engagement and desired level of engagement
- The aimed outcome of the engagement activity

Table given below provide the list of different consultation techniques suitable for the project and that will be applied for the entire Project lifecycle, depending upon the stakeholder group.

Methods of Engagement

Methods of Engagement	Stakeholder Group	Stage of the Project	Purpose and Application
One to one surveys/interview	<ul style="list-style-type: none"> • Landowners impacted • Land users impacted (if any) • Land users along the transmission line route • Landowners along the transmission line route 	<ul style="list-style-type: none"> • Land Procurement stage • Pre-construction stage, starting from baseline study for LRP 	<ul style="list-style-type: none"> • The purpose of this engagement mechanism will be primarily to collect the primary household level data required for the LRP baseline • This method of engagement will be done by the SAEL’s land team • These interviews will be held on a one-to-one basis with a pre-determined set of open questions or check points use to gather information. Pertaining to specific themes or issues • These interviews will be held in the homesteads of the stakeholders, or any other location agreed upon with the representatives • To the extent possible, women members of the household will be encouraged to participate in the interviews
One to one surveys/interview	<ul style="list-style-type: none"> • Local administration at Gram Panchayats • Revenue Department • State owned DISCOMS 	Project Inception and planning stage	<ul style="list-style-type: none"> • The purpose of this engagement mechanism will be to build trust and a relationship with each of these stakeholders • Another key purpose of these interviews will be to meet the regulatory requirements for the project and to collect essential secondary data existing with the government departments • These interviews will be held on a one-to-one bases with a pre-determined set of open questions or check points use to gather information pertaining to specific themes or issues

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Methods of Engagement	Stakeholder Group	Stage of the Project	Purpose and Application
			<ul style="list-style-type: none"> These interviews will primarily be held in the offices of the stakeholder, or any other location agreed upon with the stakeholders
Focus group discussions	<ul style="list-style-type: none"> Landowners along the transmission line route (wherever applicable) Vulnerable households General Community Gram Panchayat 	<ul style="list-style-type: none"> Baseline study for LRP 	<ul style="list-style-type: none"> The primary purpose of FGDs will be to facilitate discussions on key topics such as: <ul style="list-style-type: none"> Compensation rates Project induced impacts Concerns of the host community The FGDs will also be used to present project information early on during planning stage and to gather insight into the thought process of the group regarding a particular issue These FGDs, especially with women and vulnerable households will enable for a relationship of trust to be built with the Project and specific concerns and feedbacks of these stakeholders' groups to be captured This method of consultation is imperative for the vulnerable groups because consultations with the entire community run risk of the dominant group's views predominating These FGDs will primarily be held in the project footprint villages and in location that will cause least inconvenience to the participating members.
Meetings – Public meetings, and meetings with the community in the Project footprint	<ul style="list-style-type: none"> Landowners along the transmission line route (wherever applicable) Vulnerable household members General community 	<ul style="list-style-type: none"> Pre-construction stage, Construction stage for regular updates and grievances Operation stage 	<ul style="list-style-type: none"> Meetings organized by the Project team will be directed for two (2) sets of audiences: <ul style="list-style-type: none"> The community at the Project footprint, household in the fence line of the Project and landowners along the TL route Wider community in the Project study area The objective of these public meetings will be to create an ongoing disclosure regarding the Project, its impacts on the socio-economic profile of households, and sharing of good practices within the community The process of information disclosure can be undertaken on voluntary basis disclosure This disclosure not only allows for trust to be built amongst the stakeholders through the sharing of information but also allow for more constructive participation in the other processes of consultation and resolution of grievances due to availability of accurate and timely information As part of the information disclosure process, critical project information will be shared and feedback will be sought from the stakeholders on the same, including: <ul style="list-style-type: none"> The key project impacts identified The details of the ESMP plans formulated as part of the IESE including the stakeholder engagement plan and grievance redressal mechanism The summary of the IESE update and the key impacts and mitigation measures identified in the same including the provisions of the management plans developed as part of ESMPs The monitoring process to be put in place for the ESMPs The participation of the local stakeholders in the implementation and monitoring process of the ESMPs and other mitigation measures identified As part of the information disclosure, an attempt will be made to disclose all relevant information (such as plans, pertaining to the community development, local employment opportunities) to the target stakeholders as early as possible, so as to allow for trust to be built in the relations At the least the next steps in the plans of the project would be explained, with a clarification on which project elements are

Methods of Engagement	Stakeholder Group	Stage of the Project	Purpose and Application
			<p>fixed and which can be subject to change or be improved upon on the basis of the consultations and stakeholder inputs shall be disclosed</p> <ul style="list-style-type: none"> The key means of disclosing the information and allowing for a process of feedback and participation has been identified as making non-technical summaries of the EMPs and the ESIA report developed and their monitoring reports, available in the form of pamphlets (in local language) and reports at key locations such as Gram Panchayat office and group meeting and discussions. The copies of the non-technical summaries identified will be made available in the local language at locations suitable to the community, to be identified with the community These public consultations will be done on an annual basis or as and when the urgency of the situation warrants having such public consultations Case will also be taken to not create false expectations as part of these meetings. When possible, an attempt shall be made to disclose actual numbers, even estimates, wherever available.
Formal Communication	<ul style="list-style-type: none"> Media NGOs Project's partners such as contractors Government Departments 	Construction and operation stage	<ul style="list-style-type: none"> This method of engagement will primarily be used for the project's partners such as contractors, and the media groups and government departments, who are critical in developing a public opinion towards the project This form of communication will primarily pertain to emails or formal telephonic conversation with a specific agenda.

5.7 Grievance Redressal Mechanism

As part of the ESIA study, the Project has developed the internal and external grievance redressal mechanism. The established GRM covers the following aspects:

- Accessibility:** The GRM should be easily accessible to all stakeholders, especially the vulnerable and disadvantaged groups, without any barriers or costs. The GRM should also provide multiple and culturally appropriate channels for receiving and addressing grievances, such as phone, email, website, social media, or face-to-face meetings.
- Responsiveness:** The GRM should acknowledge and follow up on the grievances promptly and effectively. The GRM should also provide clear and realistic timelines for the resolution process and keep the complainants informed of the progress and outcomes.
- Impartiality:** The GRM should ensure that the grievances are handled in a fair and objective manner, without any bias or influence from any party. The GRM should also employ qualified and independent staff or mediators to investigate and resolve grievances.
- Transparency:** The GRM should disclose relevant information about the grievance process and outcomes to the complainants and other stakeholders. The GRM should also maintain a record of the grievances and their resolution and report on them periodically.
- Effectiveness:** The GRM should provide satisfactory and sustainable solutions to the grievances that address the root causes and prevent recurrence. The GRM should also monitor and evaluate its performance and impact and seek feedback from the complainants and other stakeholders to improve its functioning.
- Learning:** The GRM should use the lessons learned from the grievances to improve the project or organization's policies, practices, and performance. The GRM should also share its best practices and challenges with other relevant parties to promote learning and innovation

Site specific Grievance Redressal Mechanism is included in the **Appendix - 4**

6 Impact Assessment & Mitigation Measures

This section assesses the manner in which the Project will interact with elements of the physical, ecological or social environment to produce impacts on resources/receptors. It has been organized as per the construction and operation phases of the project life cycle to understand the risks and impacts associated with each phase.

6.1 Project Activities

An overview of the project key activities during different phases of the project has been summarised below:

Table 6-1 Proposed Project Activities

Sr. No.	Project Phase	Activities
1.	Pre-Construction Phase	<ul style="list-style-type: none"> • Site Survey • Land lease • Signing the Power Purchase Agreement (PPA) • Preparing the detailed design, engineering, procurement and construction (EPC) plans • Project approvals and licenses • Finalization of EPC contractor and other contractors • Finalization of solar panel technology (e.g., monocrystalline, polycrystalline, thin film) and inverter technology (e.g., central inverters, microinverters) based on project goals and budget • Preliminary stakeholder engagement
2.	Construction Phase	<ul style="list-style-type: none"> • Contractor mobilization • Site Preparation including fencing, clearing of trees, bushes, pit filling, levelling and grading • Transportation of construction material • Construction of site office • Construction of temporary storage facilities • Foundation laying for ground mounted structures • Storage of PV modules delivery and their installation • Laying of internal electrical connections • Installation of inverter and transformers • Hazardous and non-hazardous waste generation from construction site and worker accommodation • Ongoing stakeholder engagement • Commissioning activities, i.e., inspection and testing
3.	Operation and Maintenance Phase	<ul style="list-style-type: none"> • Wet and dry cleaning of PV modules • Routine inspection of all PV modules and associated structures viz. cables, transformers, inverters, mounting structures etc. • Inspection of water tankers/water network and cleaning of septic tanks • Inspection and maintenance of 220kV TL; and • Inspection and maintenance of internal pathways and access roads within the solar plant. • Hazardous and non-hazardous waste generated from construction site and worker accommodation • Ongoing stakeholder engagement
4.	Decommissioning phase	<ul style="list-style-type: none"> • Develop a detailed decommissioning plan that outlines the entire process, including timelines, resource allocation, and safety measures

Sr. No.	Project Phase	Activities
		<ul style="list-style-type: none"> • Safely disconnect and isolate all electrical components, including inverters, transformers, and wiring, to ensure no electricity flows through the system during decommissioning • Dismantle and remove solar panels, racking, and support structures, following manufacturer and industry best practices • Dispose of or recycle all materials and components in compliance with local regulations and environmental standards • Demolishing and removing any structures or foundations that support the solar equipment, such as racks, poles, piles, or concrete pads. This may require cutting, crushing, or excavating the materials and filling any holes or trenches with suitable backfill • Restoring the site to its original or agreed-upon condition • End of contractual agreement of human resource providing contractors or other contractors • Ongoing stakeholder engagement

6.2 Scoping

As part of the ESIA study, scoping exercise has been carried out to identify the potential area of influence for the project to identify potential interactions between the project and resources/receptors in the area of influence and the impacts that could result from these interactions and to prioritize these impacts in terms of their significance. This stage is intended to ensure that the impact assessment focuses on the issues that are most important for decision-making and stakeholder interest.

The impact interaction matrix highlighting the potential interaction between project activities and resources/receptors has been presented in below table:

6.2.1 Potential Impact Interaction Matrix

The potential interaction matrix for project activities and likely impacted resources/receptors is presented in the below table:

Table 6-2 Potential Impact Interaction Matrix

Potential Impact Interaction Matrix		Resources													
		Topography and Drainage	Land Use	Soil Environment	Groundwater Resources	Surface Water Resources	Air Environment	Noise Environment	Terrestrial Ecology	Aquatic Ecology	Land Based Livelihood	Economic Environment / Employment	Social and Cultural Environment	Occupational Health and Safety	Community Health & Safety
Activities	Pre-Construction Phase														
	Site Survey														
	Land Identification and Land Lease									√	√	√			
	Project Approvals and Licenses														
	Finalization of Contractors														
	Construction Phase														
	Contractor mobilization						√	√				√	√	√	√
	Site Preparation including fencing, clearing of trees, pit filling, levelling and grading	√	√	√	√		√	√	√			√	√	√	
	Transportation of construction material via heavy motor vehicles			√			√	√	√			√		√	√
	Construction of site office, SCADA room and internal roads within plant		√	√		√	√	√	√			√		√	
	Construction of temporary storage facilities		√	√		√	√	√	√			√		√	
	Foundation laying for ground mounted structures		√	√	√	√	√	√				√		√	
	Storage of PV modules delivery and their installation		√	√	√	√	√	√				√		√	
	Hazardous and non-hazardous waste generated from construction site and worker accommodation			√	√	√			√	√				√	
	Laying of internal electrical connections		√	√			√	√				√		√	
	Installation of inverter and transformers		√	√	√	√	√	√				√		√	
	Operation and Maintenance Phase														
	Routine inspection of all PV modules and associated structures viz. cables, transformers, inverters, mounting structures etc.				√	√		√						√	
	Inspection and maintenance of transmission cables				√	√		√			√			√	
	Inspection and maintenance of internal pathways and access roads.			√	√	√	√	√						√	
Hazardous and non-hazardous waste generated from site office and worker accommodation			√	√				√	√				√		
Power evacuation through overhead transmission line to the Kurnool-III ISTS PSS 765/400kV/220KV substation			√					√*					√		

*Collision and Electrocutation Risks

6.3 Scoped out interactions

Based on interactions defined in **Table 6-2** the impacts on the following resources have been scoped out:

Table 6-3 Scoped out of Potential Interactions

Sr. No.	Impact	Rationale for Scoping out
1.	Ambient Air Quality Impacts during Operation Phase	During operation phase, no significant impact on air quality is envisaged since solar power projects are less polluting power source, and power generation from solar plant will not lead to increase in air emissions. However, there will be deployment of vehicles on site for operation and maintenance work. Since the O&M work will be undertaken once or twice a year, the air emissions are envisaged to be negligible. Hence the project activity and receptor interaction has been scoped out
2.	Impact on Indigenous People	The proposed solar site land including the tentative TL route does not fall under Schedule-V areas as defined in the Indian Constitution under Article 244(1). Based on the information shared by the SAEL team, site findings and review of secondary data reveals that the land being involved for solar plant and TL does not comprise of any tribal land/ land parcels owned by members belonging to the Indigenous Peoples (IP) and there is no established dependency of tribals on the said land. Moreover, it is to be noted that there are no Scheduled Tribe population reported within the project village Koduru. Hence the proposed project is not expected to have impacts on indigenous people.
3.	Impact on common property usage or culturally sensitive areas	As confirmed during the site visit, there are no structures, common property resources, water bodies, structures bearing cultural importance were observed within the proposed solar plant site and SAEL had reported to avoid such cultural important places while considering the Transmission Line route. Based on the review of secondary data from Archaeological Survey of India (ASI) ⁴³ and Google earth pro no cultural heritage falls inside the study area of 5 km radius. The nearest ASI Notified sites are located at the distance of ~8 km (Rameswara Swamy Temple, and Chintalarayasvami Temple Tadipatri)

6.4 Impact Assessment Methodology

This section assesses the manner in which the Project will interact with elements of the physical, ecological or social environment to produce impacts to resources/receptors. It has been organized as per the construction and operation phases of the project life cycle to understand the risks and impacts associated with each phase.

6.4.1 Impact Estimation & Assessment

Criteria	Sub-Classification	Defining Limit
Spread: refers to area of direct influence from the impact of a project activity	Insignificant / Local spread	impact is restricted within the footprints of the Project boundary or within 500m of the boundary
	Medium Spread	impact is spread beyond 500m up to 2 km of the Project boundary
	High spread	impact is spread beyond 2 km to 5 km from footprint boundary of the Project
Duration: based on duration of impact and the time taken by an environmental component to	Insignificant / Short Duration	when impact is likely to be restricted for duration of less than 12 months;

⁴³ <https://asi.nic.in/>

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Criteria	Sub-Classification	Defining Limit
recover back to its best possible pre-project state	Long Duration	when impact is likely to be extended up to 10 years
	Permanent	when impact is likely to be extended beyond 10 years
Intensity: defines the magnitude of Impact	Insignificant intensity	when resulting in changes in the environmental baseline conditions is up to 10%
	Low intensity	when resulting in changes in the baseline conditions up to 20%
	Moderate intensity	when resulting in changes in the baseline conditions for up to 30%
	High intensity	when change resulting in the baseline conditions beyond 30%
Nature: refers to whether the effect is considered positive or negative	Positive	When impact will result in positive or beneficial change in the study area
	Negative	When impact will result in negative or adverse change in the study area
Frequency: refers to extent of occurrence of any activity/ task	Intermittent	Activities which may be undertaken intermittently but may not be continuous or have impact only when undertaken beyond certain intensity
	Routine	Activities which will be undertaken on regular and daily basis as part of construction or operation of the project

Based on the above, an impact significance matrix to assess the various impacts as presented in the table below. The potential impacts from pre-construction, construction and operation phases of the project are discussed in the subsequent sections

6.4.2 Impact significance criteria

Spread	Duration	Intensity	Magnitude
Local	Short	Low	Negligible
Local	Short	Moderate	Small
	Long	Low	
	Long	Moderate	
	Permanent	Low	
Medium	Short	Low	Substantial
Local	Short	High	

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Spread	Duration	Intensity	Magnitude
Medium	Long	High	Major
	Permanent	Moderate	
	Short	Moderate	
	Long	Low	
	Long	Moderate	
	Permanent	Low	
	Permanent	Moderate	
High	Short	Low	
	Short	Moderate	
	Long	Low	
	Long	Moderate	
	Permanent	Low	
Local	Permanent	High	
Medium	Short	High	
	Long	High	
	Permanent	High	
High	Short	High	
	Long	High	
	Permanent	Moderate	

In case of social and ecological impacts due to the project activities, vulnerability of the impacted receptor shall also be assessed in addition to characterizing the magnitude of impact. Multiple factors have been considered while defining the vulnerability of the resource/receptor, which may be biological, cultural, or human as presented in table below. Other factors have been also considered while characterizing vulnerability, such as legal protection, government policy, stakeholder views and economic value.

The **vulnerability characterization** used herein for social and ecological receptors are:

- Low
- Medium
- High

Furthermore, for health and safety impacts due to the project activities, probability of incidence occurrence has been considered. The probability of an incidence occurrence has been established via qualitative scale as presented in **Table 6-4**. The **probability** used herein for health and safety incidence are:

- Unexpected
- Possible
- Expected

Table 6-4 Criteria for Receptor Vulnerability

Receptors	Sub criteria	Low	Medium	High
Impact on Local Community	<p>The impact on local community of their socio-economic conditions would be raised due to:</p> <ul style="list-style-type: none"> • Potential loss of land-based livelihood • Potential Loss of Livelihood • Labour Influx • Employment Opportunities 	<ul style="list-style-type: none"> • Minimum vulnerability consequently with a high ability to adapt to changes brought by the Project and opportunities associated with it 	<ul style="list-style-type: none"> • Some but few areas of vulnerability; but still retaining an ability to at least in part adapt to change brought by the Project 	<ul style="list-style-type: none"> • Profound or multiple levels of vulnerability that undermine the ability to adapt to changes brought by the Project
Habitat Sensitivity	Not Applicable	<ul style="list-style-type: none"> • Habitats with negligible interest for biodiversity. • Habitats with no, or only a local designation / recognition, habitats of significance for species listed as of Least Concern (LC) on IUCN Red List of Threatened Species • Habitats which are common and widespread within the region, or with low conservation interest based on expert opinion 	<ul style="list-style-type: none"> • Habitats within nationally designated or recognized areas • Habitats of significant importance to globally Vulnerable (VU) Near Threatened (NT), or Data Deficient (DD) species • Habitats of significant importance for nationally restricted range species • Habitats supporting nationally significant concentrations of migratory species and / or congregator species • Low value habitats used by species of medium value 	<ul style="list-style-type: none"> • Habitats within internationally designated or recognized areas • Habitats of significant importance to globally Critically Endangered (CR) or Endangered (EN) species • Habitats of significant importance to endemic and/or globally restricted-range species • Habitats supporting globally significant concentrations of migratory species and / or congregator species • Highly threatened and/or unique ecosystems, areas associated with key evolutionary species • Low or medium value habitats used by high value species
Species Sensitivity	Not Applicable	<ul style="list-style-type: none"> • Species with no specific value or importance attached to them • Species and sub-species of Least Concern (LC) on the IUCN Red List of Threatened Species • Not meeting criteria for medium or high value 	<ul style="list-style-type: none"> • Species on IUCN Red List as Vulnerable (VU) Near Threatened (NT), or Data Deficient (DD) • Species protected under national legislation • Nationally restricted range species, nationally important numbers of migratory, or congregator species • Species not meeting criteria for high value, and species vital to the survival of a medium value species 	<ul style="list-style-type: none"> • Species on IUCN Red List as Critically Endangered (CR) or Endangered (EN) • Species having a globally restricted range (i.e., plants endemic to a site, or found globally at fewer than 10 sites, fauna having a distribution range (or globally breeding range for bird species) less than 50,000 km²) • Internationally important numbers of migratory, or congregator species • Key evolutionary species, and species vital to the survival of a high value species

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6.5 Impact on Physical Environment

The proposed Project site is located in Koduru Village, Kondapuram Tehsil of YSR District. For the purpose of developing the solar power project SAEL has identified about 1881.32 acres of Dry Agriculture private land from Koduru Village, out of which ~1500 acres will be procured for the proposed project. This section outlines the potential impacts on the physical environment due to project activities planned during different phases of the Project lifecycle

6.5.1 Construction Phase: Impact Assessment

6.5.1.1 Land Use

6.5.1.1.1 Context

As per discussion during site visit, it is understood that the past land use of the Project site was agricultural land which was primarily covered with agricultural crops and trees, predominantly Neem, Tamarind and Acacia. Currently, sorghum and chickpea is being cultivated in the designated land parcels, characterized by a soil composition consisting mainly of a blend of sand and black soil within the region. According to the Arc GIS mapping of the land falling within project study area, it was observed that majority of land use in the study area was agricultural land (49.89%) followed by open scrub land (42.65%). The land use pattern of the study area of the Project has been presented in **Figure 4:11**.

The ~12 km transmission line connecting the pooling substation to 220KV Kurnool-III ISTS Grid Substation will pass through private scrub land and patches of agricultural land. However, the project will construct storage yard, internal access road within the 300 MW plant, site office (for construction phase) as part of the project which will be developed on the identified land within the project boundary and no separate land will be leased out for the same. The project activities such as installation of solar modules, and construction of internal roads are expected to alter the land use throughout the project life cycle (i.e., 25 years).

Structures, albeit of temporary nature, which will support project activities during the construction stage such as storage yards, etc. will have an impact on the immediate vicinity of the construction area. The construction phase is expected to last approximately 12 months, following which the temporary structures will be dismantled from their respective locations with the returning of land to its acceptable pre-construction state. However, internal roads, transmission lines and permanent structures such as solar modules, site office and the pooling substation will remain until the end of the Project life cycle (i.e., 25 years).

6.5.1.1.2 Impact Magnitude

Since the change in land use will be limited to the project site, therefore the spread is local. However, the duration of the change will be permanent i.e., till the project lifecycle and the intensity is classified as low as the resulting change in the baseline will be limited to project site and surrounding area. Therefore, as per Impact Significance criteria, the impact magnitude on land use resource due to the project has been classified as **Small**.

6.5.1.1.3 Mitigation Measures proposed for the Project

- Construction activity will be restricted to designated area;
- On completion of the construction activities, land used for temporary facilities will be restored to the extent possible;
- The land use around the permanent project facilities will not be disturbed.
- Demarcated roads will only be used for transportation purpose
- Waste litter will be avoided in and around the project area.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Low	Intermittent	Small
With Mitigation Measures	Negative	Local	Permanent	Low	Intermittent	Small to Negligible

6.5.1.2 Topography and Drainage

6.5.1.2.1 Context

The 300 MW solar power project is proposed to be located on flat to undulating topography with elevation ranging between 199 m to 256 m above mean sea level (refer **Figure 4:12**).

As observed during site visit, there are no major water bodies that pass through the proposed Project site, however, there is one small water body present within the project site. The nallah was also observed within the project site running from west to east ultimately connecting the Penna river stream which is located at an aerial distance of ~2 km towards south direction of the project boundary. During E&S Advisors site visit, it was observed that the nallah as well as the Penna river stream appeared to be dried up. A small seasonal-water pond was also observed within the project area which as reported collects the rainwater, reportedly, not used for any applications. As per the project site team, the rainwater pond will not be disturbed in course of project implementation and also the water from the pond will not be used for project purpose. There are no major water bodies located within the study area, however, there are dendritic to sub-dendritic drainage lines passing through the project (refer **Figure 4:22**).

Typically, solar power projects do not undertake major levelling of topography. However, the topography may be altered slightly due to the minor levelling, excavation work at the solar site, development of internal roads within the plant and development of SCADA and site office. Clearing and minor levelling of land may be done prior to any civil work, although these changes are envisaged to be small and restricted to the immediate vicinity of the Project components.

6.5.1.2.2 Control Measures for the Project

The EPC contractor at site will be instructed to avoid any unnecessary changes in the topography. Appropriate number of cross drainage channels will be provided in and around the project site to maintain flow in existing natural drainage channels.

6.5.1.2.3 Impact Magnitude

Since the topography of the site may be altered slightly which will be restricted within the project site, the spread is categorized as local. Furthermore, since the slight alteration to the topography will remain throughout the project lifecycle, the duration has been classified as permanent. The intensity and frequency have been classified as moderate and intermittent respectively and any alteration to the project site may impact the surrounding lands and drainage lines. Therefore, based on Impact Significance criteria, the impact magnitude on topography and drainage has been classified as **Substantial**

6.5.1.2.4 Proposed Mitigation Measures

- Levelling and grading activities will be carried out with as little disturbance to the existing contour as possible, in order to retain the general slope of Project site
- SAEL will ensure that developer will not alter the flow and drainage pattern during installation of the solar panels. And same shall be included as a condition EPC contractor bid document.
- To the extent possible, disruption/alteration of drainage patterns will be avoided.
- Uncontaminated spoil generated from excavation work will be reused to the extent possible for backfilling purpose, restoration of contaminated location within project boundary etc.
- Spoils which cannot be reused will be disposed through authorised vendor.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Moderate	Intermittent	Substantial
With Mitigation Measures	Negative	Local	Permanent	Low	Intermittent	Small

6.5.1.3 Air Quality

6.5.1.3.1 Context

Air quality will largely get impacted from the following sources during the construction phase:

- Fugitive dust emissions from site clearing, excavation work, minor levelling work at solar site, stacking of soils, handling of construction material, transportation of material, emission due to movement of vehicles and heavy construction machinery at solar site etc.
- Vehicular emissions due to traffic movement on site and on access roads
- Exhaust emissions from construction machineries, other heavy equipment like bull ajax mixer, bull dozers, transit mixers, compactors etc.
- Emissions from diesel generators required during construction activities.

Based on ambient air quality monitoring conducted at four locations within the Project study area, all the air quality parameters for all the locations were found to be within NAAQS permissible limit. However, the levels of PM 10 in AAQ 1, AAQ 2, AAQ3, and AAQ 4 exceeded the standards as per IFC EHS guidelines value but were within the Interim Target-3 values. Similarly, the PM 2.5 levels in AAQ 1, AAQ2, AAQ3 and AAQ4 exceeded the standards as per IFC EHS guidelines value but were within the Interim Target-3 values (refer **Table 4-6**). The 300 MW Project is proposed to be developed on land measuring ~1500.00 acres and the air quality impacts would be confined to 500 m of the construction activity area, material storage area, transmission line route, villages located within 500 m of the project site and access routes. The Project will not have any long-term impact on the ambient air quality of the study area including transmission line route. However, the Project study area is characterized by the presence of clayey and coarse loamy soil, coupled with the fact that construction activities will involve an increase in the number of vehicles entering the region. State Highways will be utilized along with village roads for transportation of construction materials. Therefore, villages along the access roads in Project AoI are anticipated to be impacted due to increased emissions.

Negligible impacts are envisaged during operational phase of the Project with respect to impact on air quality since the 300 MW solar power project is a renewable energy Project which does not lead to air emissions. As for impacts due to vehicular emissions and fugitive dust emissions, they are assessed to be limited considering vehicles will use upgraded approach roads (thus nullifying the impacts arising from fugitive dust) and during maintenance activities which will be planned to occur only a few times a year. Additionally, since the ambient air baseline parameters exceeded the levels as per IFC EHS guidelines but are within the interim target 3, therefore, the airshed can be considered as degraded for 24 hours mean for PM10 and PM2.5 levels as per IFC EHS guidelines. However, since solar power projects are less polluting source of energy, air emissions due to the project will be only limited during construction phase that will last for 12 months. Considering, the project is a renewable energy project, there will be negligible air emission, therefore, it is anticipated that there will be no significant change in the baseline ambient air conditions during project operations.

6.5.1.3.2 Control Measures for the Project

- Preventive measures such as storage of construction material in sheds, covering of construction materials during transportation will be undertaken, for reducing dust emissions
- Proper maintenance of engines and use of vehicles with Pollution under Control (PUC) Certificate.

6.5.1.3.3 Impact Magnitude

Impacts on ambient air quality during construction activities will be for a limited period i.e., 12 months, therefore, the impact duration has been assessed to be long. Furthermore, since there will be dust emissions due to construction activities at the project site and along the access routes, the spread has been assessed to be local. The intensity and frequency have been classified as moderate and routine respectively as the construction activities will be undertaken regularly for 12 months within the project site and at transmission line route. Since the Konduru and Murugampalli village is located within 55 m and 40 m respectively of the project boundary, these settlements may be impacted due to dust emission during peak construction activity. However, since there will be construction vehicles deployed by other developers as well on the access roads, the emission due to the project will be limited. Therefore, the impact magnitude based on the impact significance criteria has been classified as Substantial

6.5.1.3.4 Proposed Mitigation Measures

- Speed of vehicles on site will be limited to 10-15 km/h which will help in minimizing fugitive dust emissions due to vehicular movement.
- Emissions from the D.G. set and other stationary machines will be controlled by ensuring that the engines are always properly tuned and maintained.
- Stack height of DG sets will be in line with the CPCB norms
- Minimize stockpiling by coordinating excavations, spreading, re-grading and compaction activities
- Cease or phase down work if excess fugitive dust is observed. Investigate the source of dust and ensure proper suppression measures;
- Idling of vehicles and equipment must be prevented
- In case of complain on dust emission from site, Project SPD along with the contractors will reconsider the construction technique and conduct frequent water sprinkling (as appropriate) to suppress dust emission
- Burning of waste at the construction site will be strictly prohibited
- All stockpile materials which are likely to generate airborne fugitive dust will be covered with canvas or plastic sheets during windy season
- Water sprinkling at the dust emitting areas should be undertaken as and when required.
- Construction materials and soil heaps will be covered
- Vehicles and machineries should be regularly inspected and maintained
- Prefabricated materials will be used to the extent possible to minimize localized air pollution
- Use Paved roads to the extent possible
- Only PUC certified vehicles will be deployed for the Project
- Air quality monitoring should be conducted during peak construction activities in and around project site, in line with SAEL ESMS.

	Nature of Impact	Spread Duration of Impact	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local Long	Low	Routine	Substantial
With Mitigation Measures	Negative	Local Short	Low	Routine	Small

6.5.1.4 Ambient Noise

6.5.1.4.1 Context

The 300 MW solar power project is proposed to be located village setting or commercial setting within 5 km radius of the project. Since the solar project is proposed to be developed, therefore prescribed to CPCB standards set for residential areas (Day time Leq = 55 and Night Leq= 45) have been considered to assess the ambient noise impact due to the project. The sources of noise in the construction phase include civil work, operation of DG sets and construction machineries such as cranes, drillers, bull dozers etc. and movement of vehicles on the access routes. There will also be increased noise levels because of increased anthropogenic movement in the study area.

Based on the ambient noise quality monitoring conducted at four locations each within study area of the project, the Leq day and Leq night values for all the samples were observed to be within the CPCB limit as well as IFC standards (refer **Table 4-7**). The construction work at the project site including operation of construction machineries are envisaged to increase the existing noise level at the project area. Since there are settlements located within 500 m of the project site, therefore, there will be minimal impact on local community due to increased noise levels at the project site.

While the proposed project is spread across two villages, Koduru and Bodaipalle, the nearest settlements are located at (i) Konduru village located at ~55m from the boundary towards south direction, (ii) Murugampalli village located at ~40m from the boundary towards northeast direction, (iii) Bodaipalle village located at ~350m from the boundary towards southwest direction and (iv) K.

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Sirigepalle village located at ~550m from the boundary towards north direction. Additionally, a school (ZP High School) is also located at a distance of ~84 m from the site towards south direction. Also, there is a temple, at the aerial distance of ~150 m in the south direction of the project boundary.

6.5.1.4.2 Control Measures for the Project

Normal working hours of the contractor will be defined (preferable 8 am to 6pm). If work needs to be undertaken outside these hours, it will be limited to activities which do not generate noise

6.5.1.4.3 Impact Magnitude

Impacts on ambient noise quality during construction activities will be for 12 months, therefore, the impact duration has been assessed to be long. Furthermore, since there will be noise emissions due to construction activities at the project site and along the access route due to movement of construction vehicles, the spread has been assessed to be local. The intensity and frequency has been classified as low and routine respectively as there are community located within 5 km of the project site which may be impacted due to high noise levels from the project. Since the project will be developed near to the settlement areas, there will be village people whose residents are located adjacent to the proposed solar project, who may be potentially exposed to noise due to project activities during peak construction. However, such activities will last for a limited period of time within the project site. Therefore, the impact magnitude based on the impact significance criteria has been classified as **medium**.

6.5.1.4.4 Proposed Mitigation Measures

- Only well-maintained equipment will be operated on-site;
- Acoustic enclosures will be provided for all the noise emitting machineries to reduce noise levels at the nearby settlements
- If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible;
- Limit the number of heavy vehicles required for the Project to only those that are necessary;
- Machinery and construction equipment that may be in intermittent use will be shut down or throttled down during non-work periods;
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Noise limits for construction equipment to be installed at the project area during peak construction such as front loaders concrete mixers, cranes (moveable), will not exceed 55 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986.
- Conduct noise monitoring once or twice during peak construction activities in and around the Project site.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Medium	Low	Routine	Medium
With Mitigation Measures	Negative	Local	Short	Low	Routine	small

6.5.1.5 Soil Environment

6.5.1.5.1 Soil Erosion and Compaction

Context

Soil compaction and erosion has been considered for construction phase only. In the operation phase, soil compaction and erosion will be limited to vehicular movement, which only happens during the occasional maintenance activities and will be within the land footprint which is already allotted during the construction phase. Soil compaction and erosion for operation phase has therefore been assessed to be negligible

During the construction phase, the topsoil will be susceptible to soil erosion to some extent due to site clearance activities. The region is characterised by clayey soil which are very sticky and have strong cohesive forces between particles which can resist erosion as compared to other soil types. The removal of stabilised topsoil would result in slope destabilisation and increase chances of soil erosion, however due to the type of soil in the region i.e., clayey soil, chances of soil erosion is assessed to be small to negligible.

As for soil compaction, since the clayey soils are highly compressible in nature, excavation and collection of soil at the solar module installation area may potentially lead to soil compaction, thus increasing surface run-off and decreasing the percolation rate of the soil. However, the excavation work will be limited only to the solar module installation locations and no larger area will be excavated due to the project.

Control Measures for the Project

- Using existing roads to access the site to the extent possible
- Topography shall be restored to the extent possible and vegetated (if feasible) to prevent soil compaction to the extent possible.

Impact Magnitude

Since the construction phase will last for 12 months, the duration has been classified as long. Furthermore, since the soil compaction may occur due to movement of vehicles on unpaved roads at the project site, the spread has been classified as local. The intensity has been classified as moderate, since in case of soil compaction at the site, the duration will be long to restore the soil to its original state and the frequency has been classified as routine. Therefore, based on impact significance criteria, the impact magnitude is assessed to be **Small**.

Proposed Mitigation Measures

- Stripping of topsoil shall not be conducted earlier than required (vegetation cover will be maintained for as long as possible) in order to prevent the erosion (wind and water) of soil;
- Top soil that has been stripped will be stored for landscaping of the site;
- The stock piles of the soil will be kept moist/covered to avoid wind erosion of the soil;
- Soil to be ploughed in compacted area after completion of the construction work;
- As a best practice, site clearance, piling, excavation and access road strengthening will not be carried out during the monsoon season to minimize erosion and run-off.
- Site to be restored at the end of construction phase

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Long	Moderate	Routine	Small
With Mitigation Measures	Negative	Local	Short	Low	Routine	Negligible

6.5.1.5.2 Soil Contamination

General construction waste generated onsite will comprise of concrete, wooden pallets, steel cuttings/filings, packaging paper or plastic, wood, metals etc. Municipal domestic wastes consisting of food waste, plastic, glass, aluminum cans and waste paper will also be generated by the construction workforce at worker accommodation. Wastewater generated at construction site will be in the form of sewage from worker accommodation. A small proportion of the waste generated during construction phase will be hazardous and may include used oil, hydraulic fluids, waste fuel, grease and waste oil containing rags. If improperly managed, solid and hazardous waste could create negative impacts on land, soil and further on groundwater. Additionally, soil contamination during the construction phase may result from leaks and spills of oil, lubricants, or fuel from heavy equipment, improper handling of chemical/fuel storage and wastewater. Such spills could have a long-term impact on soil quality.

Control Measures for the Project

- SAEL at the corporate has a dedicated waste management framework as part of the Environmental and Social Management System which will be followed at the Project.
- Hazardous material and waste will be properly labelled, stored onsite at a location provided with impervious surface and in a secondary containment system.

Impact Magnitude

Any leaks and spills of hazardous waste from project activities may contaminate the soil in project site and nearby areas, therefore the spread has been classified as medium. Furthermore, contamination of soil may last for long period of time, thus the duration has been classified as long. The intensity has been classified as moderate as the soil contamination may have impact on the soil of project area and nearby areas. Therefore, the impact magnitude as per impact significance criteria has been assessed to be **Substantial**.

Proposed Mitigation Measures

- EPC Contractor will ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site
- Designated areas within the project premises will be provided for Solid Municipal Waste.
- An authorized third party vendor will be engaged to collect municipal solid waste from the site on daily basis. Alternatively, Project SPDs should appoint a vendor for collection of solid waste on daily basis.
- Implement a municipal waste collection schedule through identified authorized vendor with sufficient frequency to avoid accumulation of garbage.
- Cover collection and transfer vehicles during the entire route of transport to avoid windblown litter;
- Wastewater generated from site office will be disposed in septic tank/soak pits. Project SPDs should identify an authorized vendor for cleaning of the soak pits/septic tanks on monthly basis. Project SPDs will ensure that the wastewater collected by the vendor is disposed at the municipal sewage treatment plant and not disposed directly into any waterbody.
- Construction and Demolition Waste will be stored separately, and it will be reused to the extent possible.
- All waste will be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from storm water drainage channels
- A logbook will be maintained for quantity and type of hazardous waste generated
- It is to be ensured that hazardous waste is not stored for more than 90 days. Hazardous waste will be disposed through CPCB/GPCB authorized hazardous waste vendor only.
- Use of spill control kits to contain and clean minor spills and leaks
- Unloading and loading protocols will be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks, and
- In case of accidental/unintended spillage, the contaminated soil will be immediately collected and stored as hazardous waste.
- Vehicle and machine maintenance, if any undertaken by Project will be carried out only on paved and impervious ground
- Conduct soil quality monitoring once during peak construction activity in and around the Project site in line with SAEL ESMS.
- EPC contractor will restore the project site and surrounding area (if used for any temporary structure) to its original condition. Project SPVs will inspect the site and ensure; the project site is properly restored prior to issuing completion certificate to the EPC contractor.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Medium	Long	Moderate	Routine	Substantial
With Mitigation Measures	Negative	Local	Short	Low	Routine	Negligible

6.5.1.6 Water Resources

6.5.1.6.1 Water Availability

Water is a prime requirement for the execution of civil works, especially with regard to preparation of raw materials like concrete etc. for civil works associated with the Project (i.e. solar PV module foundation and installation, casting, construction of proposed site office, SCADA room).

Project has planned to procure water through authorized third party, in tankers. Source of water, as per the current practice in the area will be from the surface water bodies (ponds/reservoirs, Lakes) from the nearby areas, not essentially from the Project village and this will be based on the availability of water sources. For drinking purpose, water campers will be procured from local vendor.

According to the data shared by client, the project will require 4,500 KL of water for the entire civil work. Additionally, for domestic and drinking purpose, the project will require 300 KL water for 200 workers during construction phase. The Project has plans to secure water through third party, in tanker, for meeting water requirement during construction. The surface water from the ponds/river/reservoir will be transported at site through water tankers.

Impact Magnitude

Since the project SPD have identified surface water for meeting water requirement during construction phase, the spread has been classified as high. Furthermore, water requirement for construction phase will last for the entire construction phase i.e., 12 months, the impact duration has been considered as long.

As per the consultations done during the site visit, it is understood that primary source of water for drinking and domestic purpose in the study area is government supply water. As per Department of Agriculture, Andhra Pradesh, rain dependent tanks form the chief source of irrigation with seasonal rivers and rivulets and wells are the other sources of irrigation.

Community dependency on the on groundwater for agricultural, drinking and domestic purpose is limited. Furthermore, groundwater status in the area is categorized as **safe** by CGWB, the impact intensity has been classified as small. Therefore, based on impact significance criteria, the impact magnitude has been classified as **Medium**.

Proposed Mitigation Measures

- Construction labour deputed onsite to be sensitized about water conservation and encouraged for optimal use of water;
- A source vulnerability assessment is recommended to be conducted (preferably during the summer season) to understand the current and future water availability in the project area.
- The Project will identify alternative source of water such as different village ponds after obtaining NOC from Gram Panchayat to avoid stress on groundwater resources.
- In case, project hire third party vendor for supply of water through tankers at the project sites, the project will conduct prior background check of the vendor to ensure that no illegal abstraction of groundwater and is practiced for supplying water to the project.
- Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers is necessary for efficient utilization of water
- Blending of low quality water with fresh water for construction uses to ensure efficient use of natural resource
- Recycling/reusing to the extent possible
- Explore water conservation scheme e.g., rainwater harvesting at the project sites.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	High	Long	small	Routine	Medium

With Mitigation Measures	Negative	Local	Long	Low	Routine	Small
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6.5.1.6.2 Water Contamination

There is a potential for contamination of groundwater resulting from improper management of sewage at project site office, worker accommodation, or other accidental spills/leaks at the storage areas.

The soil type of the area is clayey soil. This type of soil usually has slow percolation rate (measured as 0.1 inches or less per hour) into the subsoil and subsequently the ground water.

Furthermore, accidental spillage of chemical and fuel may easily contaminate the ground water. Therefore, the spillage of chemicals and fuel may cause measurable changes in the ground water quality during construction activities (i.e. 12 months).

As observed during site visit, river is located within 2 km from the project site, improper management of waste including municipal solid wastes, hazardous wastes by workers on site may contaminate the surface water in case, such wastes are thrown directly into the water bodies. Furthermore, sewage generated onsite or from worker accommodation if directly discharged into the salt marshes may contaminate such water resources.

Control Measures for Project

- Provision of septic tank and soak pits onsite and at worker accommodation for treatment and disposal of sewage, thereby minimizing the impacts of wastewater discharge.
- Planning of toilets, soak pits and septic tanks, waste collection areas will be away from natural drainage channels
- Provision for impervious storage area, especially for fuel & lubricant, hazardous waste, etc. will be made onsite.
- SAEL at the corporate has a dedicated waste management framework and environmental monitoring framework which will be implemented at the Project

Impact Magnitude

Since, any spillage or leaks may contaminate the water resources of the Project area, the spread has been classified as Medium. Furthermore, there will be long term impact on water quality in case of leaks/spills, the duration has been classified as long. The intensity has been classified as moderate, since surface water will be the primary source of water for project activities, therefore, any change in surface water quality may impact on workers of the Solar Plant. Therefore, based on impact significance criteria, the impact magnitude has been classified as **Substantial**.

Proposed Mitigation Measures

- Hire/engage licensed contractors for management and disposal of waste and sludge
- Labourers will be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage will be strictly restricted
- Ensure adequate number of toilet facilities are provided to the workers at construction site and labour accommodation.
- Spill/leakage clearance plan to be adopted for immediate cleaning of spills and leakages
- Hazardous material will be kept on impervious layer with secondary containment
- In case of accidental/unintended spillage, the contaminated soil will be immediately collected and stored as hazardous waste
- Periodically, monitor the ground water quality in line with SAEL ESMS
- Excavated materials, scrap materials and other non-hazardous and hazardous waste will be stored away from salt marshes prior to their disposal.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Medium	Long	Moderate	Routine	Substantial
With Mitigation Measures	Negative	Local	Short	Low	Routine	Negligible

6.5.2 Operation Phase: Impact Assessment

6.5.2.1 Ambient Noise

6.5.2.1.1 Context

During operation phase, no significant noise impacts are envisaged from the project. There may be impact due to movement of vehicles for operation and maintenance work at the plant, however, the same will be carried out once or twice a year. Furthermore, there will be movement of staffs on and off from site during working hours and anthropogenic activities at the worker accommodation. However, noise from movement of workers and worker accommodation are anticipated to be limited.

6.5.2.1.2 Impact Magnitude

Based on the above context, noise impact magnitude during operation phase has been assessed to be **Small to Negligible**.

6.5.2.1.3 Proposed Mitigation Measures

- Vehicle drivers should be instructed not to blow horns until necessary
- Anti-honking sign boards to be placed at entry / exit points of the project
- Vehicles should be maintained regularly to avoid noise from engines etc.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Long	Low	Routine	Small to Negligible
With Mitigation Measures	Negative	Local	Short	Low	Routine	Negligible

6.5.2.2 Soil Environment

6.5.2.2.1 Context

During operation phase, the waste generated from Project will include domestic solid wastes at worker accommodation, SCADA building and substation and hazardous wastes like waste oil from DG sets and transformers, and oil containing jutes and rags. There are chances of spillage of oil during maintenance work such as lubricating oils from transformers etc. The accidental spillages of oil/lubricants and hazardous waste generated during maintenance work may cause contamination of soil and ground water. There is a likelihood of spillage to occur at an area that is designated for storage of hazardous wastes.

During operation phase, the quantity of municipal waste and hazardous waste generated will be less as compared to construction phase and probability of the hazardous waste generation will be only during maintenance work and therefore occasional.

6.5.2.2.2 Control Measures for the Project

- The waste generated would be routed through proper collection and containment.
- The hazardous wastes will be stored onsite at separate designated covered area provided with impervious flooring and oil spill control kit will be used for cleaning small spills and leaks.
- SAEL at the corporate has a dedicated waste management framework as part of the Environmental and Social Management System which will be followed at the Project

6.5.2.2.3 Impact Magnitude

Since there will be limited hazardous and non-hazardous waste, and the spillage may be restricted to project site therefore, the spread and duration has been classified as small and short respectively. The intensity has been classified as moderate due to the type of soil in the area such that, any leaks/spillage of hazardous oil may seep into the soil and further into groundwater. Therefore, the impact magnitude as per impact significance criteria has been assessed to be **Small**.

6.5.2.2.4 Proposed Mitigation Measures

- Domestic waste generated at site to be segregated onsite
- An authorized third party vendor will be engaged to collect municipal solid waste from the site on daily basis. Alternatively, Project SPDs will appoint a vendor for collection of solid waste on daily basis.
- Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system
- Discarded solar panels, laptops, monitors at SCADA room will be stored in a designated area within the Project site and disposed in line with E-waste management rules, 2022.
- Ensure routinely disposal of hazardous waste through approved vendors and records are properly documented
- Oil/ lubricants will be stored on impervious floor in the storage area having secondary containment
- Use of spill control kits to contain and clean minor spills and leaks during O&M activities
- The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages
- The sewage generated onsite will be treated and disposed in septic tanks and soak pits. A dedicated schedule will be developed for cleaning of the soak pits and septic tanks by third party vendor.
- Transportation vehicles and equipment should undergo periodic maintenance at local workshops in Bhuj city to avoid any oil leakage
- Any unloading and loading protocol will be prepared for diesel, oil and used oil respectively and workers trained to prevent spills and leaks.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Short	Moderate	Intermittent	Small
With Mitigation Measures	Negative	Local	Short	Low	Intermittent	Negligible

6.5.2.3 Water Resources

6.5.2.3.1 Water Availability

As mentioned earlier in the report, the project will use robotic dry cleaning method, supplementary wet cleaning for the 300 MW Project (65% -70% dry cleaning and 30%-35% wet cleaning).

Manual wet cleaning is estimated to require approximately 2 to 3 liters per module, while robotic wet cleaning systems are typically more efficient, consuming around 1.5 to 2 liters per module, depending on the technology used. Therefore, using an average of 2.5 liters for wet cleaning, approximately 1,514 KL of water will be necessary for cleaning 605,775 modules in one cycle. For robotic wet cleaning, about 1,212 KL of water will be needed per cycle.

For domestic and drinking purposes, approximately 16 KLD (considering 80 litres/person/day for 200 workers) will be required.

The water during operation phase Project will secure water through third party, in tanker, for meeting water requirement for module cleaning (dry clean & supplementary wet clean). The surface water from the ponds/river/reservoir will be transported at site through water tankers. For drinking purpose packaged water bottles will be supplied at the solar plant. Project will not abstract groundwater for the module cleaning and domestic/drinking purpose.

Additionally, as per the consultations done during the site visit, it is understood that primary source of water for drinking and domestic purpose in the study area is government supply water. As per Department of Agriculture, Andhra Pradesh, rain dependent tanks form the chief source of irrigation with seasonal rivers and rivulets and wells are the other sources of irrigation.

Community dependency on the on the groundwater for agricultural, drinking and domestic purpose is limited. Furthermore, groundwater status in the area is categorized as safe by CGWB, the impact intensity has been classified as small.

Impact Magnitude

During operation phase, since water will be majorly required for module cleaning (dry and supplementary wet cleaning), therefore the spread and duration has been classified as local and permanent respectively.

The intensity has been classified as moderate, since the amount of water required per cycle of module cleaning will be comparatively less, as project will be using the dry cleaning method, supplemented by wet cleaning (65% -70% dry cleaning and 30%-35% wet cleaning). However, abstraction of water for module cleaning may pose stress on existing surface water resources. Therefore, based on the impact significance criteria, the impact magnitude has been classified as **Substantial**.

Proposed Mitigation Measures

- Optimizing water usage in the SCADA building and site office by application of water conservation measures such as sensor-based taps, low flush urinals etc.
- Implement rainwater harvesting systems to capture and utilize precipitation, thereby augmenting surface water availability and reducing demand on existing sources.
- Promote groundwater recharge initiatives, such as constructing recharge wells or enhancing permeable surfaces, to maintain and replenish groundwater levels.
- Establish a robust monitoring system to track water levels, quality, and usage patterns, ensuring that we can respond promptly to any signs of depletion or contamination.
- Check feasibility to adopt dry robotic module cleaning technology
- Project SPD will identify alternative source of water such as village ponds or ground water from nearby villages to receive water.
- Records of daily water consumption to be maintained.
- Regular inspection for identification of water leakages and preventing wastage of water.
- Recycling/reusing to the extent possible
- Feasibility of constructing rainwater harvesting system at site should be checked.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Moderate	Intermittent	Substantial
With Mitigation Measures	Negative	Local	Short	Moderate	Intermittent	Small

6.5.2.3.2 Water Contamination

During operation phase, wastewater generation is expected to be from solar wet module cleaning. Additionally, sewage would be generated from worker accommodation, site office and SCADA building which may contaminate the nearby water resources if not disposed properly. However, the amount of sewage generated during operation phase will be of almost negligible quantity.

Impact Magnitude

Since limited amount of wastewater will be generated from the project, the spread, duration, and intensity has been classified as local, long, and low respectively. Therefore, the impact magnitude is assessed to be **Small**.

Based on the baseline environmental quality data, the impact associated with pesticide usage in the surrounding agricultural lands is considered insignificant and hence no specific management plan for pesticide usage in the surrounding agricultural lands is deemed necessary.

Proposed Mitigation Measures

- The provisions of septic tank and soak pits will be provided onsite for disposal of sewage, thereby minimizing the impacts of wastewater discharge.
- Project SPDs will develop a cleaning schedule of soak pits/septic tanks. It will identify an authorized vendor for cleaning of the soak pits/septic tanks as per the cleaning schedule. Project SPDs will ensure that the wastewater collected by the vendor is disposed at the municipal sewage treatment plant and not disposed directly into any waterbody.
- Project SPD will ensure that adequate drainage line in and around the site to avoid impact on natural drainage channels due to discharge of wastewater from solar module cleaning within site.
- Planning of toilets, soak pits and septic tanks, waste collection areas will be away from salt marshes

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Significance of Impact
Without Mitigation Measures	Negative	Local	Long	Low	Intermittent	Small
With Mitigation Measures	Negative	Local	Short	Low	Intermittent	Negligible

6.6 Impact on Biological Environment

6.6.1 Construction Phase: Impact Assessment

6.6.1.1 Habitat Modification and Loss

The project is coming on the modified habitat - agricultural land. Due to the establishment of the project, the land use of the 1594.97 Acres area will be permanently (throughout the lifecycle of project) changed. Similarly, the land use of the area (110 Acres) going to be utilized for transmission infrastructure will also be changed (for ~12.78 km long transmission line).

As per the baseline, the project site is pre-dominated by agricultural land along with *Acacia nilotica* (L.) Delile, *Azadirachta indica* A.Juss., *Calotropis procera* (Aiton) Dryand., *Croton bonplandianus* Baill., *Prosopis juliflora* (Sw.) DC., *Prosopis cineraria* (L.) Druce, and *Ziziphus mauritiana* Lamk.. No floral species of conservation importance was identified in the study area.

The secondary data reports, three Vulnerable [River Tern (*Sterna aurantia*), White-naped Tit (*Macholophus nuchalis*), & Yellow-throated Bulbul (*Pycnonotus xantholaemus*)]; four Near Threatened [Alexandrine Parakeet (*Palaeornis eupatria*), Black-headed Ibis (*Threskiornis melanocephalus*), Oriental Darter (*Anhinga melanogaster*), & Spot-billed Pelican (*Pelecanus phillippensis*)]; and 07 Schedule I [Bonelli's Eagle, Changeable Hawk-Eagle, Eurasian Spoonbill, Indian Peafowl, Montagu's Harrier, Peregrine Falcon, & Shikra] species from the region. However, during the site visit, one Vulnerable [River Tern (*Sterna aurantia*)] and two Near Threatened [Black-headed Ibis (*Threskiornis melanocephalus*), & Oriental Darter (*Anhinga melanogaster*)]; and three (03) Schedule I species [Eurasian Spoonbill (*Platalea leucorodia*), Indian Peafowl (*Pavo cristatus*), & Shikra (*Accipiter badius*)] were observed from the study area.

Among the recorded (reported / observed) herpetofauna, three species [Bengal Monitor Lizard (*Varanus bengalensis*), Indian Rock Python (*Python molurus*) & Red Sand Boa (*Eryx johnii*)] were categorized under Near Threatened category of the IUCN Red List (Online Version 2024-1); and six species (Bengal Monitor Lizard, Indian Rock Python, Indian Cobra, Russell's Viper, Oriental Ratsnake, & Red Sand Boa) were listed under the Schedule I category.

Among the recorded (reported / observed) mammals, one was Vulnerable [Bonnet Macaque (*Macaca radiata*)] and one was Near Threatened [Tufted Grey Langur (*Semnopithecus priam*)] as per IUCN Red List (Online Version 2024-1). Five species (Bengal Fox, Golden Jackal, Indian Crested Porcupine, Indian Wolf, & Jungle Cat Bengal Fox) were listed under the Schedule I category.

Control Measures planned for the Project

According to the discussion with the project officials, the clearance of vegetation will be limited to the project area.

Impact Magnitude

During the construction phase, the land use of ~1500.00 acres area will be changed for the project life, thus the Duration is Permanent. As the construction activities will be performed only in the project boundary, the **Spread** has been classified as Local.

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The **Intensity** has been classified as *Moderate* as the habitat of the receptor species will be modified and loss permanently. Thus, the impact magnitude has been classified as **Substantial** based on the impact significance criteria (6.4.2).

Proposed Mitigation Measures

The mitigations proposed to minimize the impact(s) on Habitat and Species have been given as,

- Site preparation and vegetation clearance activities should be restricted within the project site and 10 m radius of transmission towers.
- Vegetation for the project surrounding area should be returned to the pre-construction state, after completion of construction activities. For this purpose, local groups from the surrounding villages could be identified and facilitated to restore the naturality of the vegetated area in 5 years.
- The area for the storage yard and other supplementary facilities should be selected away from any natural habitat such as scrub land, water body, and river.
- Unnecessary disturbance of neighboring vegetation due to off-road vehicular movement, fuel wood procurement, and destruction of floral resources should be prohibited.
- There should be a ban on the use of woody plants as kitchen fuel, collected from the nearby areas (specifically from the scrub lands), and commercial LPG cylinders and stoves should be provided for kitchen use.
- Plantation of native plants in and around the project boundary (as per feasibility), on the available land should be practiced and promoted.
- The use of herbicides within the project site should be strictly prohibited.

The implementation of above-mentioned measures will reduce the intensity from moderate to low by decreasing the percentage of baseline (from 30% to 20%) to be affected by project activities.

	Nature of Impact	Spread of Impact	Duration	Intensity	Receptor Vulnerability	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Moderate	Medium (Habitat) Medium (Species)	Substantial
With Mitigation Measures	Negative	Local	Permanent	Low	Medium (Habitat) Medium (Species)	Small

6.6.1.2 Impacts on the Habitat and Species due to Construction Activities

Construction of substations, labor camps and transmission towers; installation of solar panels and power lines; increases movement of people and goods; noise; light pollution, and the potential for sedimentation/pollution of water resources due to excavation and filling operations in the study area. These activities are evaluated in terms of habitat and species disturbance. Excavation for construction activities directly impacts burrowing fauna, such as foxes, mongoose, Lizard; and indirectly impacts flora and fauna through changes in soil properties. There is a possibility, that the anthropogenic migration has resulted in increased stress on the fauna of the region, requiring them to remain vigilant for extended periods of time, preventing proper reproduction, nesting, mating, socialization, and foraging. Anthropogenic movements (transportation of people and goods) and noise from construction activities can also disturb the fauna of the surrounding area.

As per the baseline, the project site is pre-dominated by agricultural land along with *Acacia nilotica* (L.) Delile, *Azadirachta indica* A.Juss., *Calotropis procera* (Aiton) Dryand., *Croton bonplandianus* Baill., *Prosopis juliflora* (Sw.) DC., *Prosopis cineraria* (L.) Druce, and *Ziziphus mauritiana* Lamk.. No floral species of conservation importance was identified in the study area.

The secondary data reports, three Vulnerable [River Tern (*Sterna aurantia*), White-naped Tit (*Machlolophus nuchalis*), & Yellow-throated Bulbul (*Pycnonotus xantholaemus*)]; four Near Threatened [Alexandrine Parakeet (*Palaeornis eupatria*), Black-headed Ibis (*Threskiornis melanocephalus*), Oriental Darter (*Anhinga melanogaster*), & Spot-billed Pelican (*Pelecanus phillippensis*)]; and 07 Schedule I [Bonelli's Eagle, Changeable Hawk-Eagle, Eurasian Spoonbill, Indian Peafowl, Montagu's Harrier, Peregrine Falcon, & Shikra] species from the region. However, during the site visit, one Vulnerable [River Tern (*Sterna aurantia*)] and two Near Threatened [Black-headed Ibis (*Threskiornis melanocephalus*), & Oriental Darter (*Anhinga melanogaster*)]; and three (03) Schedule I species [Eurasian Spoonbill (*Platalea leucorodia*), Indian Peafowl (*Pavo cristatus*), & Shikra (*Accipiter badius*)] were observed from the study area.

During the site survey, consultations with forest officials⁴⁴, and villagers no significant foraging, breeding, or nesting sites for ecologically significant species have been recorded from the study area.

Among the recorded (reported / observed) herpetofauna, three species [Bengal Monitor Lizard (*Varanus bengalensis*), Indian Rock Python (*Python molurus*) & Red Sand Boa (*Eryx johnii*)] were categorized under Near Threatened category of the IUCN Red List (Online Version 2024-1); and six species (Bengal Monitor Lizard, Indian Rock Python, Indian Cobra, Russell's Viper, Oriental Ratsnake, & Red Sand Boa) were listed under the Schedule I category.

Among the recorded (reported / observed) mammals, one was Vulnerable [Bonnet Macaque (*Macaca radiata*)] and one was Near Threatened [Tufted Grey Langur (*Semnopithecus priam*)] as per IUCN Red List (Online Version 2024-1). Five species (Bengal Fox, Golden Jackal, Indian Crested Porcupine, Indian Wolf, & Jungle Cat Bengal Fox) were listed under the Schedule I category.

Control Measures planned for the Project

No information available.

Impact Magnitude

During the construction phase, the above-mentioned activities will be performed for a limited period i.e., 8-10 months, thus the **Duration** has been *Short*. As the construction activities will be performed in the project boundary, labor accommodations, mixing plants and equipment storage sites, the **Spread** has been classified as *Medium*. The **Intensity** has been classified as *Moderate* as the numbers of species inhabiting the area impacted by the construction activities. Thus, the impact magnitude has been classified as *Substantial* based on the impact significance criteria (6.4.2).

Proposed Mitigation Measures

The mitigations proposed to minimize the impact(s) on Habitat and Species have been given as,

- Night-time (6:00 pm to 6:00 am) construction and transportation activities should be avoided.
- The areas of high animal activity, such as open scrubs and water bodies the construction and transportation activities should be avoided during dawn (6:00 am to 7:30 am) and dusk (5:00 pm to 6:30 pm).
- The night lamps, consist of low-glare & low UV LED lights/bulbs, should be shielded, or covered to focus the light downward.
- In addition to the motion sensor automated LED lights, minimizing the use of floodlights can also be effective in reducing light pollution.
- Hazardous materials should be avoided to store near water bodies, and salt marshes - sea water.
- Sites with existing burrows or roosts should be avoided where possible, and temporary fencing should be installed over excavated areas.
- Construction activities must implement proper housekeeping, properly dispose of discarded packaging materials, and provide labor accommodations with adequate sanitary facilities.
- Movement of workers between accommodations and construction sites should be restricted and they should not be allowed to visit in natural areas (specifically scrub land) not included the planned construction activities.
- Frequent patrols of the project's perimeter will be conducted to deter the entry and accidental entrapment of large mammals.
- During the construction phase, perch deterrents may be correctly installed on transmission towers/poles.

	Nature of Impact	Spread of Impact	Duration	Intensity	Receptor Vulnerability	Significance of Impact
Without Mitigation Measures	Negative	Medium	Short	Moderate	Medium (Habitat) Medium (Species)	Substantial
With Mitigation Measures	Negative	Local	Short	Moderate	Medium (Habitat) Medium (Species)	Small

⁴⁴ From Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division

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6.6.2 Operation Phase: Impact Assessment

6.6.2.1 Collision and Electrocution Risk due to the Power Transmission, etc.

In any power generation project, collision and electrocution are the universally recognized risks due to the transmission infrastructures. Several species of birds tend to perch on wires and towers/poles in the area. It has been observed across power projects globally that avifaunal species utilize the transmission towers/poles for nesting, hunting prey or using the height of the manmade structure as a lookout for predators. These transmission lines and towers/poles can potentially constitute an electrocution and collision hazard to birds (specifically for the larger wingspan birds). During the ecological survey, several species of birds were found perching on existing wires and poles in the study area. 220 kV transmission line of about 12.78 km length as well as transmission towers can possibly cause the risks of electrocution and collision to birds.

The secondary data reports, three Vulnerable [River Tern (*Sterna aurantia*), White-naped Tit (*Machlolophus nuchalis*), & Yellow-throated Bulbul (*Pycnonotus xantholaemus*)]; four Near Threatened [Alexandrine Parakeet (*Palaeornis eupatria*), Black-headed Ibis (*Threskiornis melanocephalus*), Oriental Darter (*Anhinga melanogaster*), & Spot-billed Pelican (*Pelecanus phillippensis*)]; and 07 Schedule I [Bonelli's Eagle, Changeable Hawk-Eagle, Eurasian Spoonbill, Indian Peafowl, Montagu's Harrier, Peregrine Falcon, & Shikra] species from the region. However, during the site visit, one Vulnerable [River Tern (*Sterna aurantia*)] and two Near Threatened [Black-headed Ibis (*Threskiornis melanocephalus*), & Oriental Darter (*Anhinga melanogaster*)]; and three (03) Schedule I species [Eurasian Spoonbill (*Platalea leucorodia*), Indian Peafowl (*Pavo cristatus*), & Shikra (*Accipiter badius*)] were observed from the study area.

Control Measures planned for the Project

No information available.

Impact Magnitude

During the operation phase, power evacuation will remain till the life of the project, thus the **Duration** has been *Permanent*. As the length of the 220 kV transmission line is about 12.78 km, the **Spread** has been classified as *Medium*. The **Intensity** has been classified as *High* as the numbers and ecological significance of species under the risk of collision and electrocution. Thus, the impact magnitude has been classified as **Major** based on the impact significance criteria (*Error! Reference source not found.*).

Proposed Mitigation Measures

The mitigations proposed to minimize the impact(s) on bird species have been given as,

- Cross arms transmission poles, suspended insulators, and insulated jump connectors should be utilized.
- Bird perch rejecters should be applied on transmission towers/poles.
- Frequent checking of the transmission towers/poles to avoid bird nesting.
- Disposal of carcasses near project components (solar plants and transmission line) should be restricted, and carcasses observed around project components should be immediately removed to avoid attracting vultures and raptors.
- A perennial water body (15.013191°, 78.136266°) is located about 1.5 km from the substation in south; the section of transmission line passing close to it (in 0.5 to 1.0 km range), should be equipped with bird fly diverters.
- A Bird Carcass Register should be maintained to record the bird mortality (with the name of the species, number, reason of death and date of report) observed and/or reported along the transmission line. In case of observation and/or report of ecologically significant species (IUCN threatened, Migratory, restricted range species) carcass, Ecology and Biodiversity expert should be consulted to avoid and/or reduce such mortalities.

	Nature of Impact	Spread of Impact	Duration	Intensity	Receptor Vulnerability	Significance of Impact
Without Mitigation Measures	Negative	Medium	Permanent	High	Medium to High	Major
With Mitigation Measures	Negative	Medium	Permanent	Moderate	Medium to High	Substantial

6.6.2.2 Human-Wildlife Conflicts

The project is situated on the modified habitats, at the same time natural and modified habitats are present within the 5 km buffer from the project boundary. These habitats support several herpetofauna, avifauna, and mammals (as described in the ecological baseline). The species that can climb, jump or fly over the walls can also enter the compound. Solar modules or other obstacles can injure wildlife and also cause human-wildlife conflicts. The Lizards mentioned above can climb and enter the project compound through the holes in the wall near the ground. Similarly, species like Bengal Fox, Bonnet Macaque, Golden Jackal, and Jungle Cat have the capacity to jump over the walls and enter the project area. Access of above-mentioned and other wildlife in the project compound during operation phase may cause a risk of Human-Wildlife conflicts.

As per the baseline, among the recorded (reported / observed) herpetofauna, Bonnet Macaque (*Macaca radiata*) - Vulnerable & Schedule II, Bengal Monitor Lizard (*Varanus bengalensis*) - Near Threatened & Schedule I, and Bengal Fox (*Vulpes bengalensis*) - Least Concern & Schedule I species have been observed in the study area, which are capable to climb/jump and thus can enter within the project compound. Beside these species, Common Krait (*Bungarus caeruleus*), Indian Rock Python (*Python molurus*), Indian cobra (*Naja naja*), Russell's Viper (*Daboia russelii*), Oriental Ratsnake (*Ptyas mucosa*), Banded Racer (*Platyceps plinii*), Red Sand Boa (*Eryx johnii*), Golden Jackal (*Canis aureus*), Indian Wolf (*Canis lupus pallipes*), Jungle Cat (*Felis chaus*), Tufted Grey Langur (*Semnopithecus priam*), & Wild Boar (*Sus scrofa*) were also reported from the study area which can also access the project boundary and proximity.

Control Measures planned for the Project

Chain link fencing will be used to surround the project area, which will allow the movement of small mammals and reptiles.

Impact Magnitude

As the project will be established for a long time, thus the **Duration** has been Permanent. As the impact is restricted within the footprints of the Project boundary or within 500 m of the boundary wall, the **Spread** has been classified as Local. The **Intensity** has been classified as Moderate as the numbers and ecological significance of species under the risk. Thus, the impact magnitude has been classified as Substantial based on the impact significance criteria (6.4.2).

Proposed Mitigation Measures

The mitigations proposed to minimize the impact(s) on bird species have been given as,

- Maintain the wall height 6 to 8 feet throughout.
- Use of metallic nets on the wall holes for rainwater to avoid entrance of large herpetofauna and mammals.
- Regular checking of the boundary wall to avoid any space for larger wildlife entrance into compound.
- Good housekeeping practices in the project compound could help to reduce the faunal attraction.
- Prohibit the use of floodlights in unnecessary areas and minimize their usage in required locations.
- Training on wildlife encounter situations and the do's and don'ts of dealing with these situations should be delivered to all the project officials, workers and supervisors.

	Nature of Impact	Spread of Impact	Duration	Intensity	Receptor Vulnerability	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Moderate	Medium (Species)	Substantial
With Mitigation Measures	Negative	Local	Permanent	Low	Medium (Species)	Small

6.7 Impact on Socioeconomics

Impacts to the socio-economic environment from Project related activities will be largely sustained in the project boundary. Further, the minimal activity related to accommodation and transportation of raw material will be extended to the nearby villages.

6.7.1 Construction Phase

6.7.1.1 Impact due to Land Leasing for Solar Farms

Based on the consultation with SAEL, it is understood that about 1881.32 acres of Dry Agriculture private land from Koduru Village have been identified, out of which ~1500 acres from 350 landowners will be procured for the proposed project. The required land is being procured by executing long term lease. The required land for solar power plant is being procured by executing long term lease agreement for the period of 29 years 11 months. The annual rental was fixed on the "AP Renewable Energy Export Policy Amendment dated 13-09-2022", which entails the developers leasing private land for Renewable Energy projects and shall pay lease rent of INR.30,000/year/acre with escalation of 5% for every two years. Since the project land procurement are underway, the status on Economic displacement and project induced vulnerability could not be assessed for the entire PAPs/ PAHs.

Since the land identified for the project is classified as Dry Agriculture land and does not suit extensive cultivation due to lack of perennial irrigation sources, the agriculture if undertaken, is only for subsistence purposes when there is rainfall. It is understood through the interaction with the landowners, the lease rent will be assured livelihood earning. Thus, it is understood that land lease will have a positive impact on the landowners and moreover the ownership of the land still remains with landowners.

Based on the site visit findings and as reported by the site team there are no physical structure located within the proposed project site and as part of the lease agreement the landowners have agreed to provide the freehold land free from any structures and trees. The landowners are encouraged to get benefited out of the salvages generated from the site clearing.

The area surrounding the leased land for project would still be used for cultivation and local livelihood purposes (as it was there in the pre-project phase) in future and the project will not restrict access or make accessibility difficult for the local community, livestock, etc. especially during the construction phase.

The impact is related to the land related human rights of local community⁴⁵. The human rights aspects of land affect issues including poverty reduction and development, right to earn a livelihood, rural planning, freedom of residence and settlement, to name but a few. SAEL has ensured that landowners are guaranteed with the fundamental human rights of the Indian Constitution. Landowners had the right to deny leasing out of their land. The leasing of land was only finalized with agreement from both the parties (Landowners and SAEL).

Impact on Grazing Activity and Herder's Livelihood

The project has been planned and implemented in a manner that avoids any adverse impact on grazing activity and the livelihoods of herders. One of the key strategies employed to ensure this outcome is the careful selection of the project site. The project has procured private agricultural land and does not include any designated grazing land. During the site visit, it was observed that there are some families within the nearby communities of the Project site who are dependent on livestock rearing and during the consultation process it is understood that they don't use the project site for the grazing purpose of their livestock.

Furthermore, to safeguard grazing activities and the livelihoods of herders in the region, the State Government has made provisions for the allotment of Grazing land to every village. This Grazing land is dedicated exclusively for grazing activities and is an essential resource for local herders. Importantly, the project development has not procured or impacted any of this Grazing land. The project team recognizes the importance of these lands for the community and has ensure their preservation throughout the project planning and implementation phases.

In conclusion, due to the meticulous site selection process and the conscientious approach to not impacting grazing activities and herders' livelihoods, we can assert that the project development will have no adverse impact on grazing activity and herders' livelihood in the project area but the details of any possible impact will be assessed during the preparation of the Livelihood Restoration Plan (LRP).

Control Measure adopted

As per the consultation with landowner and project land team, the land lease rate was established based on consultation and fair negotiation with landowners.

Impact Magnitude

⁴⁵ In the local context, the land is not a mere commodity, but an essential element for the realization of many human rights. Local communities considered land as linked to peoples' identities, and so is tied to social and cultural rights. For many people, land is a source of livelihood and is central to economic rights.

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The impact magnitude of the land lease is evaluated to be of substantial.

Proposed Mitigation Measures

- As part of the Livelihood Restoration Plan (LRP), the baseline status among the PAHs/PAPs will be established. The LRP will be developed by giving special considerations to the vulnerable groups, including the elderly, women, disabled, households without labor, SCs/STs etc.
- It is important to ensure that the marking of the physical boundary for the project land is done in alignment with the legal requirements and in consultation with the relevant landowners.
- Timely payment of the lease rent to the respective landowners Timely sharing of project related information with all relevant stakeholders
- If any of the land parcel belongs to women landowner, market-based compensation shall be paid to the actual women owner of the land, not to their male counterparts. Moreover, if any land parcel belongs to minor (under 18), compensation to the right person shall be paid as per India law in this regard to avoid discrimination of vulnerable groups
- Provision of Grievance Redressal Mechanism (GRM) to all impacted stakeholders to raise and register their grievances

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Receptors' Vulnerability	Magnitude of Impact
Without Mitigation Measures	Negative	Medium	Short	Insignificant	Intermittent	High	Substantial
With Mitigation Measures	Negative	Medium	Short	Insignificant	Intermittent	Medium	Small

6.7.1.2 Impact due to Installation of TL Towers and Stringing

- Installation of transmission line of ~12.78 km will result in economic displacement⁴⁶. As the construction of transmission line (especially tower) will obstruct the usage of the resource (agricultural land) and will also result in loss of standing crops / trees. The impact duration will be for short period of time for the land within RoW and there may be permanent restriction of use of land within the tower footprint area. As per rough estimates the average area of a tower digging is 8 m x 8 m = 64 m² (Ref⁴⁷) per each tower
- The stringing of transmission line will not result in obstruction of resource (agriculture land). However, the stringing will result in loss of standing crops
- The impact is related to the land related human rights of local community. The human rights aspects of land affect issues include poverty reduction and development, right to earn a livelihood, rural planning, freedom of developing residence and settlement, etc.

Control Measures Planned for the Project

Payment to landowners for obtaining the easement rights of transmission line, shall be made in compliance with the "Guidelines for payment of compensation towards damages in regard to the Right of Way for transmission lines dated 15th Oct 2015". And.

Impact Magnitude

The impact magnitude of the land lease is evaluated to be of **Small to Negligible**, due to nature of the agricultural land and low crop yield in the area.

Proposed Mitigation Measures

⁴⁶ Economic displacement – Loss of income streams or means of livelihood resulting from obstructed to resource (land) resulting from construction of transmission line.

⁴⁷ The area of tower will depend on the type of tower, the illustration is given for understanding purpose as the design is yet to be finalized therefore the actual requirement of land may differ.

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The proposed mitigation measures to mitigate the impact, are provided below:

- The project will conduct Livelihood Restoration Plan (LRP) to establish the baseline status among the PAHs/PAPs along with Livelihood restoration programs by giving special considerations to the vulnerable groups, including the elderly, women, disabled, households without labor, SCs/STs etc.
- Obtain easement rights of the land in accordance with the applicable reference framework of this report
- The project shall not adopt any lawful expropriation for obtaining easement rights of land
- The purchase rate shall be decided in negotiation with landowners and shall be in accordance with the market rate of the similar type of land and in compliance with the Ministry of Power issued – “Guidelines for payment of compensation towards damages in regard to Right of Way for transmission line”
- If any of the land parcel belongs to women landowner, market-based compensation shall be paid to the actual women owner of the land, not to their male counterparts. Moreover, if any land parcel belongs to minor (under 18), compensation to the right person shall be paid as per India law in this regard to avoid discrimination of vulnerable groups
- Erection and stringing to be carried out post harvesting or during the agriculture lean season. If any crop loss is envisaged, adequate compensation shall be paid based on the yield value at the replacement cost.
- Timely sharing of project related information with all relevant stakeholders
- Provision of Grievance Redressal Mechanism (GRM) to all impacted stakeholders to raise and register their grievances

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Receptors' Vulnerability	Magnitude of Impact
Without Mitigation Measures	Negative	Local	Short	Insignificant	Intermittent	Medium	Small
With Mitigation Measures	Negative	Local	Short	Insignificant	Intermittent	Low	Negligible

6.7.1.3 Labour Rights and Welfare – Project’s on-roll employees and contractual workers

6.7.1.3.1 Context

The project will employ skilled, semi-skilled and unskilled workers during the construction phase, which will include contractual and regular (on-roll) employees. The contractual and on-roll employees may consist of local and migrant workers. As reported, ~200 contractual workers will be employed by the Project during the construction phase.

For the Project, the workforce will be an asset, and a sound worker-managed relationship is a key ingredient to the substantiality of the Project. Failure to establish and foster a sound worker-manager relationship can undermine the workers’ commitment and retention, which can jeopardize the Project’s schedule. Conversely, through a constructive worker-manager relationship and by treating workers fairly and providing them with safe and healthy working conditions, the project may see tangible benefits, such as the enhancement of efficiency and productivity.

6.7.1.3.2 Control Measure Planned for the Project

SAEL at the corporate level has established the Environmental and Social Management System (ESMS) and the same will be applicable on the Project. The established ESMS has provisions and framework to ensure the labour rights and welfare covering both on-roll employees and contractual workers.

Further, as reported, the project will establish and develop project specific human resource policies or SOPs in compliance with applicable reference framework (ARF) of this report, regular monitoring and audit of the workers’ working conditions & terms of employment and provide safe working place.

6.7.1.3.3 Significance of Impact

The overall impact significance of the labour rights and welfare impact is **Major**. The significant of the impact is based on (but not limited to):

- **Working conditions and management of worker relationship:** Human Resource policy, working relationship, working conditions and terms of employment, workers’ organization, non-discrimination, retrenchment, and grievance mechanism

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- **Protecting the workforce:** Migrant workers, child labour, and forced and bonded labour
- **Occupational health and safety:** Providing workers with a safe and healthy work environment

6.7.1.3.4 Proposed Measures for the Project

The following additional mitigation measures are suggested to ensure compliance with labour laws/provisions, applicable reference framework and as well as industry best practices:

- HR policy and management system for the Project are satisfactory to AIIB. HR manual to include the following:
 - Organizational chart and clear description of responsibilities between HR/Admin functions at the project level and SAEL corporate level
 - HR policy and HR procedure covering aspects required by law and AIIB’s ESF , ILO’s core labour standards – CLS, such policies against gender-based violence and sexual harassment (POSH), equal opportunity, etc.
 - Code of conduct
 - Tools, a set of forms and register, written labour contracts, supporting the implementation of HR policy and procedures
 - Workers’ GRM to cover permanent staff and non-employees (agency workers and contractors)
 - HR and labour training plan and materials
 - Monitoring, auditing reporting arrangement
 - Policy on retrenchment and layoff of staff with a commitment to develop retrenchment plan if required at least 3 months prior to retrenchment.
 - Recruitment schedule for key staff
 - Continuous review and update HR MS
- The project shall establish a formal policy or commitment to support the collective bargaining for all on-roll and contractual workers
- Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity
- The labour accommodation facility for contractual workers and as well as for regular employees should meet the requirement of the applicable reference framework, and EBRD and IFC’s guidelines on workers’ accommodation – in terms of space per workers, water, and sanitation facilities, first aid, lighting and ventilation, etc. Further, the project shall undertake regular (basis of fixed timeline) monitoring to ensure compliance through the Project lifecycle
- The Project should also ensure a monthly and regular auditing mechanism for monitoring the sub-contractors and suppliers with respect to compliance with the applicable national regulations (refer to section 3 for more details on applicable national regulations on workers) and applicable reference framework of this report. The compliance shall be in terms of (but not limited to) resources, workers’ working conditions, migrant workers, child labour and forced labor, GBVH (Gender-based violence and harassment), health and safety, etc.
- The Project shall also establish provisions related to non-employment and abolition of any form of child labour and forced and bonder labour in the contractual agreement with Human Resource contractors. Further, the Project publicly shall showcase its commitment toward non-employment of child labour, and forced and bonded labour
- Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity.
- The Project shall ensure the labour rights and welfare in compliance with the ILO’s eleven (11) fundamental instruments:
 - Freedom of Association and Protection of the Right to Organize Convention
 - Right to Organize and Collective Bargaining Convention
 - Forced Labour Convention
 - Abolition of Forced Labour Convention
 - Minimum age convention
 - Worst Forms of Child Labour Convention
 - Equal Remuneration Convention
 - Discrimination (Employment and Occupation) Convention
 - Occupational Safety and Health Convention

Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	ofSignificance of Impact
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Without Mitigation Measures	Negative	Adverse	Local	Short Term	High	Large	Major
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Small	Minor

6.7.1.4 Impact Due to Influx of Migrant Workers

6.7.1.4.1 Context

As reported by the Project, during the construction phase of the Project, ~200 construction workers will be employed at the project. The project and its contractor shall provide preference in employing local workforce, since the project implementation requires specialized skillset during the construction activity the skilled workforce are expected to be migrant workmen.

Labour influx for the purpose of this report refers to people who move to a project area for the purpose of project-related employment, economic opportunities, and related reasons during project construction. The specific definition of labour influx for this report are as follows:

- *Direct labour influx:* non-local people induced to the project area by employment just before or during the construction stage, who are hired or contracted directly by the Project or the main contractors.
- *Indirect labour influx:* non-local people who have been induced to the project area by the prospect of employment just before or during the construction stage and who are hired by sub-contractors and local businesses who provide goods and services to the main contractors or to the mobile workforce.
- *Labour-associated influx:* non-local people induced to the project area just before or during construction who have or are seeking association with the direct or indirect project workforce in some way such as workers' families, refugees and/or non-economic migrants.

It is envisaged that the project in-migration most commonly will occur in response to direct and indirect employment and economic opportunities. Project development and operation will offer an array of economic opportunities, including:

- Employment with the Project
- Benefits offered by the Project's compensation and community development activities.
- Opportunities for local communities to provide support service to migrant labour
- Opportunities for local communities to supply goods and services that may capture the substantial increases of disposable cash incomes in the local area
- New business opportunities catalyzed by the influx of migrant labour (e.g., small restaurants & eateries, guest houses,, grocery shops).

While project-induced labour influx can **benefit** the project, the project area and host communities (e.g., by increasing business opportunities, improving the availability of goods and services, and offering employment to local people), it can also commonly lead to adverse **social impact**. If not carefully managed, labour influx can negatively affect public infrastructure, utilities, public services housing, health outcomes, food security and social dynamics in the Project area.

Additionally, labour influx for construction work can lead to a variety of adverse social and environmental risks and impacts. The list below provides a summary of typically adverse social and environmental impacts, but is not exhaustive:

Social Impacts

- Risk of social conflict
- Increased risk of illicit behaviors and crime
- Influx of additional population
- Impact on community dynamics
- Increase burden on and competition for public service provision
- Increase risk of communicable diseases and burden on local health services
- Gender-based violence
- Local inflation of prices

- Increased pressured on accommodation and rents
- Increase in traffic and related accidents

Environmental Impacts

- Inadequate waste disposal and illegal waste disposal sites
- Wastewater discharge
- Increase demand for freshwater resources
- Increase use or/demand for natural resources

6.7.1.4.2 Control Measure Planned for the Project

The project as part of its contractor agreement, will require each contractor to have an environmental, health & safety, and social (EHS&S) plan in place, as well as procedure for monitoring the EHS&S performance of contractors and their migrant workers. Further, the project will limit the interaction of migrant workers with local community by providing construction workers' accommodation and basic necessities to the workers inside the Project boundary.

6.7.1.4.3 Significance of impact

The potential negative impact include:

- The social consequences of influx can significantly impact the economy and livelihood strategies of people resident within the project area. As increased in population can lead to increase in demand for food, fuel, housing and short-term shortfalls in supply can lead to medium-to-longer terms inflationary pressures on prices in the Project's area of influence
- Rapid influx may significantly alter existing levels of communicable diseases, including respiratory problems diarrheal disease, vector-borne disease such as malaria, and sexually transmitted infection, by introducing "new infectives" and increasing the number of people who might spread illness. For example, one case of malaria will typically produce five (5) additional cases
- Influx migration may hasten the introduction and/or increased expression of vices such as crime, gender-based violence, internal conflict within labors and violence.

Considering the above mentioned above impacts, the receptor sensitivity is assessed to **moderate** since the local community has past experience of solar power plant and other industries, and influx of migrant labour.

6.7.1.4.4 Additional Mitigation Measures Planned for the Project

The following additional mitigation measures are suggested in order to mitigate or minimize the impact on local community's resources and utilities:

- Employment of local labour: the project and its contractor shall provide preferential employment or recruitment to local labour (provided on availability of local labour)
- Managing Project induced in-migration

Table 6-5 Proposed approach for managing project induced in-migration

Approach	Category of Intervention	Interventions
Management plans	<ul style="list-style-type: none"> • Prepare management plans • Safeguard Mechanisms 	<ul style="list-style-type: none"> • Prepare a labour management plan with inclusion of labour in-flux mitigations • Implementation of appropriate mitigation and monitoring programs, which includes development and implementation of an influx labour and local community stakeholder engagement program • Establishment of Grievance Redressal Mechanism (GRM) among the workers and local (host) community

Approach	Category of Intervention	Interventions
Policies	<ul style="list-style-type: none"> Social and Labour policies 	<ul style="list-style-type: none"> Development and adoption of social and labour policies or commitment to adhere to SAEL's ESMS, as necessary – should include passing them onto their subcontractors
Management of project-induced in-migration induced immigration	<ul style="list-style-type: none"> Minimizing in-migration into the Project area Staging the inflow of migrants Managing the migrant physical and social footprint 	<ul style="list-style-type: none"> Planning Access routes Spatial planning, administration, and resource allocation (including construction of workers' accommodation and providing of daily grocery and domestic usage things inside the project boundary) Infrastructure, service. And utilities Access control Planning material transportation Planning worker transportation Planning workers' renting procedure (for those who do not want to stay in project provided accommodation) Planning procurement of goods and services and development of supply centers
Managing environmental impact	<ul style="list-style-type: none"> Waste management Water management 	<ul style="list-style-type: none"> Measure to be adopted for adequate waste disposal and restriction of illegal waste disposal site Maintain an adequate wastewater discharge methods, so that the waste discharged from workers' accommodation shall not pollute the existing nearby water resources Adequate timely monitoring by project for waste and water management shall be undertaken. The monitoring shall be in compliance with the EBRD and IFC – workers' accommodation: processes and standards, 2009
Managing social impacts	<ul style="list-style-type: none"> Managing social conflicts Managing risk of communicable diseases Managing gender-based violence 	<ul style="list-style-type: none"> Prepare a SOP for contractors and influx labour related to manage social conflicts related to religious, cultural or ethnic differences in between influx labour and local (host) community Pre- medical checkup of workers should be conducted prior to appointment of any migrant worker Regular medical check-up (quarterly) should be conducted during the construction phase of the project Manage the gender biased violence
Monitoring and auditing of contractor(s) with relation to migrant workers' accommodation and resources	<ul style="list-style-type: none"> Regular monitoring and auditing Approval and withholding of invoices 	<ul style="list-style-type: none"> The Project shall undertake the regular monitoring and auditing of contractor(s) to ensure the compliance with applicable rules and regulation, workers; terms of employment and working condition, workers' accommodation compliance with EBRD/IFC guidelines on workers' accommodation Temporary withholding shall be done in case of repeated minor violation of EHS&S requirement that are not leading to significant impacts on workers, external parties or resources; minor violations that are not corrected after repeated warnings of first-time major violation that can be corrected easily and that have not led to permanent EHS&S impacts. The withheld amounts shall be paid upon sub-contractor(s) correction of the defiance to the Project's satisfaction Permanent withholding will be done for minor violations that are not corrected after repeated warnings and that could result in significant impacts. Some portion of such withholding may be released upon satisfactory resolution of the issues, but some significant portion will be permanently withheld as a penalty to discourage repeated incidents Payments that are subject to temporary or permanent withholding will encompass all or a portion of the payment stipulated for a line item in the bill or quantities, representing the compensation owed for a distinct segment of the overall workforce. The Project, in collaboration with its contractor's Environmental, Health, Safety, and Sustainability (EHS&S) personnel, will collaborate with project

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Approach	Category of Intervention	Interventions
		<p>management and other relevant parties to determine the precise amount to be withheld. This withholding amount will not be solely contingent on the cost of compliance; instead, it will be set at a marginally higher level and calculated as a specific percentage of the associated line item.</p> <ul style="list-style-type: none"> Contractor(s) will be notified of the specific amount that must be taken in order to receive further payments for the works in question or to receive payment that has been temporarily withheld

Labour Assessment – Labour assessment shall be carried out at different level, depending on the initial assessment of the project risk posed by labour practices, it may take place as part of a regular monitoring and auditing of on-roll workers and contractual workers. The labour assessment should include a review of the employment policies, the adequacy of existing policies, and management’s capacity to implement.

Table 6-6 Proposed approach for labour assessment

Approach	Category of Intervention	Responsibility	Interventions
Labour assessment	<ul style="list-style-type: none"> Description of the workforce Description of working conditions and terms of employment Description of types of employment relationships Description of the working environment and identification of any workplace health and safety issues Compliance with national employment and labour law 	<ul style="list-style-type: none"> The description of all the workforce engaged in the construction phase shall be collected by contractor and submitted to Project. The project shall on random basis verify the information shared by contractors. Furthermore, the Project shall maintain information related to workers who are on-roll basis The assessment of workers condition and terms of employment shall be undertaken by Project through its internal EHS&S team on monthly basis prior to clearing of monthly bill of contractors. Furthermore, the project shall undertake assessment of occupational health and safety of workers The project shall undertake the assessment on status of compliance of appointed contractors with national employment and labour law on monthly basis prior to clearing of monthly bill of contractors 	<ul style="list-style-type: none"> Description of the workforce includes number of workers. Types of jobs and skills, and composition of the workforce (gender, age, minority status, etc.) and numbers employed through contractors and other third parties Working conditions and terms of employment – a copy of the policies and procedures covering labour relations and human resources management should be maintained at the site. All collective bargaining agreements that apply to the project should be included as part of these policies Health and safety issues include mitigation measures to protect the welfare of the workforce or address identified risks. Both risks that arise from normal functions and operations as well as less common circumstances and accidents that are known to be a risk within the industry or locality should be covered. The assessment should identify work areas, equipment and processes that may require redesign, risk reduction or hazard control measures Compliance with national employment and labour law- An explanation of the nature of any violations of applicable labour laws, copies of reports from national inspectorates or other enforcement bodies and a description of remediation steps taken

Stakeholder engagement and Grievance Redressal – development and use of appropriate communication media and messaging beyond the immediate project area of influence

Table 6-7 Proposed approach for stakeholder engagement.

Approach	Category of Intervention	Interventions
Stakeholder Engagement and Grievance Redressal	<ul style="list-style-type: none"> Stakeholder Engagement and Grievance Redressal Mechanism 	<ul style="list-style-type: none"> Ensure all the migrant workers are informed on stakeholder engagement plan and trained on grievance redressal mechanism
	<ul style="list-style-type: none"> Monitoring and evaluation 	<ul style="list-style-type: none"> The project shall regularly monitor engagement process and grievance received from workers and external stakeholders. Further, shall also monitor the effective redressal of grievances and open grievances

Further, as a mitigation measures, as part of the assignment, the Project has developed the workers' accommodation management plan (**Annexure 10**), and stakeholder engagement plan (SEP) and grievance redressal mechanism (GRM) (**Annexure 13, 14 and 15**)

	Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	of Significance of Impact
Without Mitigation Measures	Negative	Adverse	Local	Short Term	Medium	Small	Moderate
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Small	Minor

6.7.1.5 Impact Due to Stress on Local Resources

6.7.1.5.1 Context

The project is located in a rural setting, migrant workers will be residing in workers' accommodation developed by the project inside the project boundary. However, some of the on-roll employees may be residing on rent basis within the local communities. While the influx of migrant workers may not have significant impact on usage of local resources as they will be absorbed within the city, there may still be impacts, including an increased demand on transport system, inflationary effect on housing renting markets, food and fuel, and potential increase in social conflict and criminal activity.

6.7.1.5.2 Control Measure Planned for the Project

The project as part of its contractor agreement will require each contractor to have an environmental, health and safety, and social (EHS&S) plan in place, as well as procedures for monitoring the EHS&S performance of contractors and their migrant workers.

6.7.1.5.3 Significance of Impact

Potential negative impact related to stress on local resources, includes:

- Increase usage of existing roads and transportation system
- Increase pressure on health services
- Increase pressure on waste management system
- Increase demand for water suppliers and sanitation
- Unplanned and uncontrolled development of squatters' settlements and development by local community to accommodate migrant workers
- Increase demand for housing

- May reduce availability and increase cost of house-renting market food, and fuel
- Increase economic vulnerability of disadvantaged groups (women, elderly, minorities, etc.)
- increase of population may increase the risk of increase in level of communicable diseases. Thus, community and regional-level disease control program for illness such as malaria, tuberculosis, and HIV/AIDS
- In addition to changes in disease patterns, increase in accidents and injuries due to changes in road traffic may affect levels of trauma and accidents, placing a strain on local health care infrastructure.

Considering the above-mentioned impacts, the receptor sensitivity is assessed to **moderate** since the local community has past experience of working at solar power plants and indulging with migrant workers. Further, as reported, the project will construct the workers' accommodation inside the project boundary so that there will be minimum interaction of migrant workers to local community.

6.7.1.5.4 Proposed Measures Planned for the Project

The following additional mitigation measures are suggested in order to mitigate or minimize the impact on local community's resources and utilities:

Managing Project Induced in-migration.

Table 6-8 Proposed Mitigation Measures for managing project induced in-migration

Approach	Category of Intervention	Interventions
Management of project-induced in-migration	<ul style="list-style-type: none"> • Staging the inflow of migrants • Managing the migrant physical and social footprint 	<ul style="list-style-type: none"> • Planning access routes • Spatial planning, administration and resource allocation (including identification of appropriate workers' accommodation sites) • Infrastructure, service and utilities • Planning workforce recruitment policy and management • Access control • Planning material transportation • Planning worker transportation • Planning workers' renting procedure (for those who do not want to stay in project provided accommodation) • Planning procurement of goods and services and development of supply centers
	<ul style="list-style-type: none"> • Addressing negative social impacts 	<ul style="list-style-type: none"> • Governance – by implementing project specific stakeholder engagement plan and grievance redressal mechanism • Managing social change – by implementing project specific stakeholder engagement plan and grievance redressal mechanism • Retrieval of negative social dynamics – by implementing project specific stakeholder engagement plan and grievance redressal mechanism • Health facilities

Stakeholder Engagement and Grievance Redressal

Table 6-9 Approach for stakeholder engagement and grievance redressal

Approach	Category of Intervention	Interventions
Stakeholder Engagement and Grievance Redressal Mechanism	<ul style="list-style-type: none"> Stakeholder Engagement and Grievance Redressal Mechanism 	<ul style="list-style-type: none"> Ensure all the workers are informed on stakeholder engagement plan and trained on grievance redressal mechanism
	<ul style="list-style-type: none"> Monitoring and evaluation 	<ul style="list-style-type: none"> The Community Liaison Officer (CLO) shall regularly monitor engagement process and grievance received from workers and external stakeholders Further, the project shall also monitor the effective redressal of grievances and open grievances

Further, as a mitigation measures, as part of the assignment, the Project has developed the workers' accommodation management plan and stakeholder engagement plan (SEP) and grievance redressal mechanism (GRM)

	Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	of Significance of Impact
Without Mitigation Measures	Negative	Adverse	Local	Short Term	Medium	Small	Moderate
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Small	Negligible

6.7.1.6 Impact on local economy and employment

6.7.1.6.1 Context

The construction and operation phases of the project will generate employment opportunities for skilled, semi-skilled and unskilled labour and domestic businesses.

The local community is likely to benefit from the economic opportunities to be created from the following:

- Civil works during the construction phase including, construction of boundary walls and other works
- Maintenance works such as manual solar panels cleaning, grass cutting, and other maintenance work
- Contracting opportunities for locals possessing tractors, water tankers, dumper trucks, earthmovers which would be needed during the construction and operation phases. Creation of indirect employment for local community through establishing small shops like tea stalls, automobile repair outlets, hardware stores, etc.
- Additionally, migration of workers would also lead to spike in economic activities in the areas. This would lead to better business opportunities for smaller vendors in the area owning petty shops, petty contractors' firm, etc. for providing essential goods and services to the project.

6.7.1.6.2 Control Measures Adopted

As gathered information from consultation with project team, the project will provide preferential job opportunities to local workers. However, the preference shall be dependent on the availability of workers and contractors that can fulfill the requirement of the Project.

6.7.1.6.3 Significance of Impact

The significance of the impact is evaluated as **substantial**.

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6.7.1.6.4 Proposed Mitigation Measures proposed for the Project

While the significance of the impact on economy and employment opportunities and local business opportunities is understood to be positive, the following measure should be put in place to ensure that the local community receive maximum benefit from the presence of the Project:

- Preference should be provided to local labour. However, the preference shall be based on availability of local labour, and skillset and knowledge.
- Project shall provide equal access to both female and male local population in available employment opportunities and for greater employability of residents.
- The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labour and resources

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Receptors' Vulnerability	Magnitude of Impact
Without Mitigation Measures	Positive	Local	Permanent	Moderate to High	Routine	Medium	Substantial
With Mitigation Measures	Positive	Local	Permanent	Moderate to High	Routine	Medium	Substantial

6.7.1.7 Contractor and Supplier Management

6.7.1.7.1 Context

As reported by the project representatives, the Project will appoint contractors Engineering, procurement and construction (EPC) and other sub-contractors to undertake the construction work for the Project. If not managed effectively, appointment of contractors will raise EHSS risks for the Project. Further, it is also challenging to ensure appointed contractors to implement the necessary environmental and social (E&S) requirements in compliance with the commitment of the Project. Thus, it is critical for the Project to adopt and implement sound, consistent, and effective approaches in compliance with the Applicable Reference Framework (ARF) of this report – to manage the E&S performance of contractors, sub-contractors, suppliers and any other third parties working for the Project.

As outlined in the preceding section, the availability of a labor force from the local community has been exhausted, and they are unable to meet the labor requirements for the Project's construction phase. Thus, the Project needs to appoint migrant workers and these workers will predominantly from the others states such as Uttar Pradesh, Rajasthan, Bihar, Jharkhand and West Bengal.

6.7.1.7.2 Control Measure Planned for the Project

As reported by Project representatives, the Project will include the E&S consideration into the contractual agreement with contractors and regular monitoring of their E&S performance.

6.7.1.7.3 Significant of Impact

The potential E&S opportunities and issues of concerns with contractors and suppliers include all aspects of Applicable Reference Framework of this report, which include (but are not limited to):

- Occupational Health and Safety
- Contractor and sub-contract workers engaged in construction activities is anticipated predominantly migrant male workers and will be paid well in the local context. These circumstances may elevate the risk of sexual exploitation and abuse (SEA) and gender-based violence (GBV)
- Non-compliance with regulatory requirement on overtime work period and overtime payment
- Non-compliance of workers' term of employment and working conditions with respects of applicable reference framework
- Labour working conditions and terms of employment – specific to discrimination, child labour, forced and bonded labour
- Safety and security related risks
- Stakeholder engagement – limited stakeholder engagement with workers and local community

- Grievance Redressal Mechanism – Limited to not availability to GRM

The overall impact of contractor and supplier management is considered as of **Major** risk (considering the numbers of contractual workers and risk involved with contractors)

6.7.1.7.4 Proposed Measures for the Project

The project shall balance local with regional concerns that can help project by:

Table 6-10 Proposed Approach for Contractor Management

Approach	Interventions
Contractor and sub-contractor Management	
Contractor Selection	<ul style="list-style-type: none"> • As part of screening process, the contractor(s) shall be asked to provide details on E&S aspects. • Environmental and Social (E&S) professionals need to be part of the contractor selection • Allow for early consideration and proper integration of E&S issues • The development of Contractor and Supplier Management plans and their incorporation into the RFP, which shall allow for: <ul style="list-style-type: none"> • Consolidation of what is included in several separate documents into concise and specific E&S commitments/requirements • A more thorough understanding of E&S requirements by the bidding contractor • Bids can more effectively integrate all needed Environment, Health & Safety and Social (ESHS) requirements (financial/human resources/technical) • Equal comparison of proposal by contractors
Pre-Qualification	<ul style="list-style-type: none"> • It involves “filtering” of contractors that initially meet established criteria • Identify (and filter out) contractors with red flags that could become risk to the Project, such as poor commitment on EHSS, high fatality rates, negative reputational issues (and risks) or poor historical E&S performance
Solicitation – typically happens through the preparation and issuing of a Request For Proposal (RFP)	<ul style="list-style-type: none"> • The RFP should include the specific requirements for the Project including the EHSS requirements. • Other information in the RFP should include corporate E&S policies • RFPs and other solicitations should require prospective contractors’ and suppliers’ bid to include E&S aspects
Proposal Evaluation	<ul style="list-style-type: none"> • Evaluation criteria should be established and included in the bid package • Key evaluation criteria, weighing of ESHS versus technical and financial • Evaluation can be on a pass-fail, quantitative and / or semi-quantitative basis • Process might involve interviews with bidders and their E&S staff • Grounds for disqualification could include failure to provide information or unacceptable past E&S (OHS) performance, material labor issues, poor security management records, fines and sanctions imposed by regulators, material community grievances and high-profile adverse press reports on E&S matters, etc.
Contracting	<ul style="list-style-type: none"> • Terms and conditions of contracting for contractor(s) shall include the E&S aspects as per requirement of SAEL’s ESMS.

Approach	Interventions
Monitoring and reporting	<ul style="list-style-type: none"> Project shall undertake spot check and inspection of appointed contractors A monthly E&S reporting shall be submitted by contractor to the Project. The terms of the report shall include (but not limited to): <ul style="list-style-type: none"> Compliance status with applicable laws and rules A brief note on working condition⁴⁸ and terms of employment⁴⁹ Details of grievances raised by workers and other external stakeholders Status of grievances received to the contractor Details of stakeholder engagement activities undertaken by contractor(s) Based on the spot check, inspection and review of monthly reporting by contractor, gap analysis of deficiency or observations shall be made Further, based on deficiency and observation provisions of temporary and permanent withholding of invoices shall be undertaken (refer to next step on deficiency and performance management of contractors)
Labour rights and welfare of engaged construction workers – for contractual workers (refer to section Error! Reference source not found.)	

Table 6-11 Proposed Approach for Supplier Management

Approach	Interventions									
Supplier(s) Selection	<ul style="list-style-type: none"> As part of initial screening process, the supplier(s) shall be asked to provide details on E&S aspects 									
Supplier(s)' selection audit	<ul style="list-style-type: none"> SAEL will conduct internal audit for the labour and Human rights compliances which shall cover the Labour working and living conditions, Minimum Wages, Child Labour / Forced Labour, Statutory compliances, etc. After initial screening, the Project shall undertake the E&S audit of potential suppliers. Based on the observations or gaps of the audit, the Project shall categorize its suppliers into High, Medium and Low-risk categories⁵⁰. Following methodology can be used for supplier(s) categorization: <table border="1"> <thead> <tr> <th>Risk Categorization</th> <th>Number of Gaps</th> <th>Nature of Gaps</th> </tr> </thead> <tbody> <tr> <td>High</td> <td>Major gaps⁵¹ in between the range of 100-50% of the total gaps</td> <td>If the suppliers have a legal non-compliance gap (irrespective of numbers) then the high-risk category shall be provided to the supplier</td> </tr> <tr> <td>Medium</td> <td>Major gaps in between the range of 49-0% of the total gaps</td> <td>No legal non-compliance shall be there in the total gaps identified</td> </tr> </tbody> </table>	Risk Categorization	Number of Gaps	Nature of Gaps	High	Major gaps ⁵¹ in between the range of 100-50% of the total gaps	If the suppliers have a legal non-compliance gap (irrespective of numbers) then the high-risk category shall be provided to the supplier	Medium	Major gaps in between the range of 49-0% of the total gaps	No legal non-compliance shall be there in the total gaps identified
Risk Categorization	Number of Gaps	Nature of Gaps								
High	Major gaps ⁵¹ in between the range of 100-50% of the total gaps	If the suppliers have a legal non-compliance gap (irrespective of numbers) then the high-risk category shall be provided to the supplier								
Medium	Major gaps in between the range of 49-0% of the total gaps	No legal non-compliance shall be there in the total gaps identified								

⁴⁸ Working condition is defined as the conditions in the workplace and treatment of workers. Condition in workplace includes the physical environment, health and safety precautions, and access to sanitary facilities. Treatment of workers includes disciplinary practices, reason and process for termination of workers and respect for workers personal dignity

⁴⁹ Terms of employment includes wages and benefits, wage deduction, hours of work, rest days, overtime arrangements, overtime compensation, medical insurance, leave for illness, maternity and so on.

⁵⁰ High, Medium and Low category shall be based on the number of nature and number of gaps identified during the audit.

⁵¹ Major gaps with a significant impacts on workers, external parties, or environmental resources

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Approach	Interventions								
	<p>Low No major gaps No legal non-compliance shall be there in the total gaps identified</p> <hr/> <ul style="list-style-type: none"> Based on the risk categorization of suppliers, high-risk suppliers cannot be selected as part of the Project’s supply chain. However, if any critical supplier falls under the high-risk category, then the Project shall ask the supplier to close, at minimum, the legal non-compliances gaps before initiating the contract. Furthermore, other gaps identified as part of the audit shall be closed as per the timeline mentioned in the corrective action plan. 								
Monitoring and reporting of newly selected suppliers	<ul style="list-style-type: none"> Following timeline of monitoring and reporting shall be adopted for suppliers: <table border="1"> <thead> <tr> <th>Different risk category suppliers</th> <th>Timeline</th> </tr> </thead> <tbody> <tr> <td>High Risk suppliers</td> <td>Quarterly</td> </tr> <tr> <td>Medium Risk Suppliers</td> <td>Half-early</td> </tr> <tr> <td>Low Risk Suppliers</td> <td>Yearly</td> </tr> </tbody> </table>	Different risk category suppliers	Timeline	High Risk suppliers	Quarterly	Medium Risk Suppliers	Half-early	Low Risk Suppliers	Yearly
Different risk category suppliers	Timeline								
High Risk suppliers	Quarterly								
Medium Risk Suppliers	Half-early								
Low Risk Suppliers	Yearly								
Contracting	Specific EHS&S terms in line with the requirement of SAEL’s ESMS and condition for supplier contracting shall be updated into the existing contract framework.								
Monitoring and reporting of existing suppliers	<p>Once all the selection process audit gaps are closed, the Project shall undertake a regular audit of existing long-term suppliers.</p> <p>The frequency shall be finalized based on the nature of the suppliers (critical and non-critical) and past experience of closing the selection audit identified gaps.</p>								
Deficiency and performance management of supplier(s)	<ul style="list-style-type: none"> Actions taken in response to previous gaps identified as part of selection or regular audit—these should continue to be reported until the project determines the issue is resolved satisfactorily Temporary withholdings should be recommended in case of repeated violations or gaps of E&S requirements that are not leading to significant impacts on workers, external parties, or environmental resources; minor violations that are not corrected after repeated warnings; or first-time major violations that can be corrected easily and that have not led to permanent E&S impacts. The withheld amounts should be paid upon contractor correction of the deficiency to the client’s satisfaction Permanent withholdings should be recommended for violations or gaps that are not corrected after repeated warnings and that could result in significant impacts; or for any violations that have resulted in significant impacts, including permanent impacts. Some portion of such withholdings may be released upon satisfactory resolution of the issue, but some significant portion must be permanently withheld as a penalty to discourage repeated incidents 								

	Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	of Significance of Impact
Without Mitigation Measures	Negative	Adverse	Local	Short Term	Medium	Large	Major
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Small	Minor

6.7.1.8 Gender-based violation and harassment (GBVH)

6.7.1.8.1 Context

The migration of male workers may have a potential high-risk of GBVH affected local community member and other workers. Risk factors that increase the potential for GBVH include:

- Large-scale influx of mainly transient male workers into small host communities with low capacity to absorb the sudden increase of workers
- Workers with different backgrounds and way of living come together to work at a particular site. Further, some of the worker will move with their family will increase the risk the GBVH among workers
- Remote locations where people have limited access to resources to report GBVH and receive support
- Poorly designed or maintained physical spaces on project sites and in workers' accommodation for example bad lighting in and around grounds and access routes
- Informal workers, whose informality means they may either be more vulnerable to GBVH due to lack of contracts or that potential perpetrators may go unidentified due to lack of background checks

6.7.1.8.2 Significance

The overall significance of the GBVH is minor, considering the limited interaction of workers with the local community. Further, as reported, the workers' accommodation for female workers (if not part of a family) will be constructed away from the male workers, and the workers' accommodation will also minimize the interaction of workers with the local community.

6.7.1.8.3 Proposed Measures for the Project

Project shall incorporate following procedure to address the potential risks of GBVH in construction phase:

- Appoint senior focal points in both Project and contractors with responsibility for ensuring that commitments and policies to prevent GBVH
- Code of conduct will be signed by all workers and will be read out at least twice a week during toolbox talk;
- Mapping list of service providers and project to sign MOU with a service provider to counsel the victim (if any); and
- Create awareness among the host population on GBV and project information board should have the cell phone number of the Community and Liaison officer.
- Put in place monitoring systems at the highest levels for regular reporting on GBVH
- Include requirements around GBVH in code of conduct, policies, and protocols for contractors, including training on policies and procedures once developed
- Ensure code of conduct are publicly disclosed in local languages and are widely accessible to all workers and all groups of people in project areas – visual campaigns (on billboards or other communication platforms available) are strongly suggested due to their effectiveness and also the workers will sign the code of conduct.
- Establish safe, confidential, and accessible grievance mechanisms for local communities
- Include options to report anonymously if preferred
- Ensure all security guards' background checks including references from most recent employers
- Use robust recruitment processes to select, train, manage and monitor security companies and personnel
- Deliver periodic mandatory training on GBVH to all workers including contractors, subcontractors and core suppliers
- Contractor to conduct effective awareness campaigns that might include perspective taking and role playing exercises as part of the training
- Include assessment of gender and safety risks in bidding process for contractors

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- Vet contractors for prior efforts to address GBVH through prevention and response
- Ensure contracts include clauses on GBVH
- Provide safe, secure, and sperate living spaces for male and female workers
- Provide lighting around project sites, including around latrines and access routes
- Install separate, lockable latrines for female workers

	Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	ofSignificance of Impact
Without Mitigation Measures	Negative	Adverse	Local	Short Term	Medium	Small	Moderate
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Negligible	Negligible

6.7.1.9 Community Health and Safety

6.7.1.9.1 Context

Community health and safety impacts associated to Solar power projects are mostly exposed the settlements in the close proximity of the project site (within 500 m) as well as along the access routes which will be exposed to health impacts from the project activities. The nearest settlements are K.Sirige Palle which is located at the distance of 130 meters from the boundary. Though the project construction activities are to be carried out within the project site boundary the village will be exposed to Community Health and Safety impacts during the construction phase. And in addition, due to labour influx as well as increase in traffic during construction phase there will be limited impact on the K.Sirige Palle village and settlements located along the access road connecting the SH-31 and the villages which are falling along the TL route. .

The community health and safety concerns mentioned above would be only limited during construction phase. And there will not be any disturbance to the local community during operation phase as the solar power plant will be developed within the site There may be deployment of O&M vehicles for operation and maintenance, however, the maintenance work at the plant will be undertaken once in a year and limited vehicles will be used for the same. Thus, community health and safety impacts during operation phase is assessed to be negligible.

6.7.1.9.2 Impact Magnitude

Community health and safety risks expected to be present throughout the construction phase due to use of heavy machineries, movement of construction vehicles in the construction activity. Since the community health and safety risks will be confined to settlements located within 500 m from the project site and access road, the spread and intensity has been assessed to be local and moderate. Therefore, the impact magnitude has been categorized as **Substantial**.

The receptor vulnerability has been classified as **Medium** since the project will lead to migrant labour influx exposing local community to communicable diseases

6.7.1.9.3 Proposed Mitigation Measures

- Ensuring that the sub-contractor agreements that the developer enters require all contractors to possess an EHS plan with provisions for monitoring of the EHS performance of contractors and their workers
- As part of the stakeholder engagement and information disclosure process, providing an understanding to the community concerning the activities proposed to be undertaken and the precautions being adopted for safety
- Based on the route survey and traffic study, identify and mark areas that are potentially sensitive to incoming traffic e.g. schools, temples, mosques, markets etc.
- As part of stakeholder engagement, the project will also propagate health awareness amongst the community, due to influx of labour in the project area.
- The traffic movement for the project in the area will be regulated to ensure road and pedestrian (including livestock) safety

- Dedicated timings should be fixed for movement of heavy motor vehicles for transportation of construction materials at project site – coordinate schedule with local village leaders
- The traffic management plan developed as part of the ESIA should be implemented at the Project location
- Community health and safety plan developed as part of the ESIA should be diligently followed at the Project location
- The workers (both regular and contractual) on the project will be provided with trainings on the Health and Safety, and their role in the same and refresher courses will be provided throughout the life of the project
- Workers and community should be provided with awareness on communicable diseases.
- Put in place a grievance mechanism to allow for the workers and community members to report any concern or grievance related to project activities
- Emergency Scenarios and Response Actions should be communicated to nearby communities.

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Receptors' Vulnerability	Significance of Impact
Without Mitigation Measures	Negative	Local	Long	Moderate	Routine	Medium	Substantial
With Mitigation Measures	Negative	Local	Long	Low	Routine	Small	Small

6.7.1.10 Occupational Health and Safety

6.7.1.10.1 Context

During construction phase, potential occupational health and safety risks are envisaged from the following activities:

- Electrocution while laying 220kV cable connecting the project to the Grid Substation.
- Physical hazards during construction of support structure for PV module requiring operation of pile drivers
- Exposure to fire hazards due to hotwork (if any) and failure of electrical installations
- Risks while working in confined spaces at the cable tranche or excavated areas.
- Fire hazards while handling oils and chemicals and cranes, and other mechanical lifting equipment
- Respiratory problems due to dust emissions from construction site
- Hearing problems due to high noise level at construction site
- Accidents due to hit by construction vehicles deployed at site
- Exposure to extreme heat while working at site during summers
- Electrocution while working with live electrical components –internal electrical parts
- Diseases due to unhygienic conditions at site including contaminated drinking water for workers

6.7.1.10.2 Control Measures for the Project

- SAEL at the corporate level has dedicated ESMS which provides measures on occupational health and safety which will be implemented at the site level. SAEL has developed Checklists, templates, and plans with respect to OHS as part of their ESMS. The checklists, templates, plans in line with OHS include the following:
 - EHS Audit Checklist
 - EHS Training Template
 - Incident Reporting and Investigation
 - Emergency Response Framework
 - Training and Competence
- Project SPVs will provide Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, safety gloves, ear muffs and face masks (as applicable) to all its workers.

6.7.1.10.3 Impact Magnitude

Since occupational health and safety risks will be confined to project site, the spread has been categorized as local. Furthermore, since the construction phase will last for 12 months, the occupational health and safety risks will also last for the same period of time, therefore, the impact duration has been classified as long and the intensity has been classified as high. Though SAEL has its own occupational health and safety management system at the corporate level that will be implemented at the site level, any hazard will lead to adverse impact on the workers. Therefore, the impact magnitude has been classified as **Substantial**.

The workers at construction site may be exposed to possible fire hazards, physical hazards, and chemical hazards, if adequate training, awareness and management measures are not communicated to the workers. Therefore, the probability of incidence occurrence has been categorized as **unexpected to possible**.

Proposed Mitigation Measures

- All workers (regular and contracted) should be provided with training on Health and Safety policies and procedures in place with appropriate refresher courses throughout the life cycle of the Project
- Code of Conduct with Dos and Donts will be part of the employee / workers contract agreement and same shall be displayed at site.
- A site-specific training calendar should be developed and implemented onsite
- Permitting system should be implemented while working in confined space as well as to ensure that cranes and lifting equipment is operated by trained and authorized persons only
- Project must not remove or tamper with or cover any underground cable markers, if provided on cable tranche
- Appropriate safety harnesses and lowering/raising tools should be used for working at heights
- Safe drinking water supply as per IS 10500:2012 should be provided for the workers
- Adequate break or interval of at least 30 minutes after five hours of work should be provided to all the workers.
- Workers should be provided awareness on drinking water in every 15 minutes while working during summers at extreme temperatures. Adequate drinking water supplies should be set up at the Project area.
- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work at the Project site. Toilet facilities should also be provided with adequate supplies of hot and cold running water, soap, etc.
- An up to date first aid box should be provided at all construction sites and a qualified person should be appointed to manage it
- All equipment should be turned off and checked when not in use
- The site-specific occupational health and safety plan and emergency management plan should follow to account for natural disasters, accidents, and any emergency situations.
- Working time should be adjusted to limit exposure to extreme heat during summer.
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, earmuffs, and face masks should be provided to the workers. A PPE inventory should be maintained onsite
- Structural integrity should be checked before undertaking any work
- Electrical and maintenance work should not be carried out during poor weather
- Excavated areas should be temporarily fenced to avoid access to outsiders and wildlife.
- Hospital ties up with nearby hospital should be carried out
- Periodic OHS audit by SAEL corporate or external party

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Probability of Incidence Occurrence	Significance of Impact
Without Mitigation Measures	Negative	Local	Long	High	Routine	Unexpected to Possible	Substantial
With Mitigation Measures	Negative	Local	Long	Moderate	Routine	Unexpected	Small

6.7.2 Operation Phase

6.7.2.1.1 Labour Rights and Welfare – Project's on-roll employees and contractual workers

6.7.2.1.2 Context

The project will employ skilled, semi-skilled and unskilled workers during the operation phase, which will include contractual and regular (on-roll) employees. The contractual and on-roll employee may consist of local and migrant workers. The number of contractual workers will be significantly lower than the construction phase. As reported by the Project, the ~30-50 contractual workers will be employed by the Project during the operation phase.

6.7.2.1.3 Control Measure Planned for the Project

SAEL at the corporate level has established the Environmental and Social Management System (ESMS) and the same will be applicable on the Project. The established ESMS has provisions and framework to ensure the labour rights and welfare of on-roll employees and as well as contractual workers.

Further, as reported, the project will establish and develop project specific human resource policies or SOPs in compliance with applicable reference framework (ARF) of this report, regular monitoring and audit of the workers' working conditions & terms of employment and provide safe working place.

6.7.2.1.4 Significance of Impact

The overall impact significance of the labour rights and welfare impact is **Moderate** considering the number of employees and contractual workers employed during the operation phase. The significant of the impact is on the basis of (but not limited to):

- **Working conditions and management of worker relationship:** Human Resource policy, working relationship, working conditions and terms of employment, workers' organization, non-discrimination, retrenchment and grievance mechanism
- **Protecting the workforce:** Migrant workers, child labour, and forced and bonded labour
- **Occupational health and safety:** Providing workers with a safe and healthy work environment

6.7.2.1.5 Proposed Measures for the Project

The following additional mitigation measures are suggested in order to ensure compliance with labour laws/provisions, applicable reference framework and as well as industry best practices:

- HR policy and management system for the Project which are satisfactory to AIIB. HR MW to include the following:
 - Organizational chart and clear description of responsibilities between HR/Admin functions at the project level and SAEL corporate level
 - HR policy and HR procedure covering aspects required by law and AIIB's ESF, ILO's core labour standards – CLS, such policies against gender-based violence and sexual harassment (POSH), equal opportunity, etc.
 - Developer will conduct internal audit for the labour and Human rights compliances on monthly basis. Which shall cover the Labour working and living conditions, Minimum Wages, Child Labour / Forced Labour, Statutory compliances, etc.
 - Code of conduct
 - Tools, a set of forms and register, labour contracts, supporting the implementation of HR policy and procedures
 - Workers' GRM to cover permanent staff and non-employees (agency workers and contractors)
 - HR and labour training plan and materials
 - Monitoring, auditing reporting arrangement
 - Policy on retrenchment and layoff of staff with a commitment to develop retrenchment plan if required at least 3 months prior to retrenchment
 - Recruitment schedule for key staff
 - Continually review and update HR MS
- The project will ensure from its contractors and suppliers that it will not procure any materials from conflict prone areas.
- The project shall establish a formal policy or commitment to support the collective bargaining for all on-roll and contractual workers
- Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allow the workers to report any concern or grievance related to work activity

- The labour accommodation facility for contractual workers and as well as for regular employees should meet the requirement of the applicable reference framework, and EBRD and IFC’s guidelines on workers’ accommodation – in terms of space per workers, water and sanitation facilities, first aid, lighting and ventilation, etc. Further, the project shall undertake regular (basis of fixed timeline) monitoring to ensure compliance through the Project lifecycle
- Project should also ensure a monthly and regular auditing mechanism for monitoring the sub-contractors and suppliers with respect to compliance with the applicable national regulations (refer to section 3 for more details on applicable national regulations on workers) and applicable reference framework of this report. The compliance shall be in terms of (but not limited to) resources, workers’ working conditions, migrant workers, child labour and forced labor, GBVH (Gender-based violence and harassment), health and safety, etc.
- Project shall also establish provisions related to non-employment and abolition of any form of child labour and forced and bonded labour in the contractual agreement with Human Resource contractors. Further, the Project publicly shall showcase its commitment toward non-employment of child labour, and forced and bonded labour
- Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allow the workers to report any concern or grievance related to work activity
- Project shall ensure the labour rights and welfare in compliance with the ILO’s eleven (11) fundamental instruments:
 - Freedom of Association and Protection of the Right to Organize Convention
 - Right to Organize and Collective Bargaining Convention
 - Forced Labour Convention
 - Abolition of Forced Labour Convention
 - Minimum age convention
 - Worst Form of Child Labour Convention
 - Equal Remuneration Convention
 - Discrimination (Employment and Occupation) Convention
 - Occupational Safety and Health Convention

	Classification of Impact	Nature of Impact	Range of Impact	Period & Scale	Vulnerability of Receptors	Magnitude of Impact	Significance of Impact
Without Mitigation Measures	Negative	Adverse	Local	Short Term	High	Large	Moderate
With Mitigation Measures	Negative	Adverse	Local	Short Term	Low	Small	Minor

6.7.2.2 Occupational Health and Safety

6.7.2.2.1 Context

During operation phase, potential occupational health and safety risks are envisaged from the following activities:

- Accidents resulting from collisions with O&M vehicles deployed at site
- Fire hazards at SCADA room, circuit box, solar PVs (Photo Voltaic) etc.
- Electrocution while working with live electrical components – transmission cables and internal electrical parts
- Physical Hazards while working in confined space
- Diseases due to unhygienic conditions at site including contaminated drinking water for workers

6.7.2.2.2 Control Measures for the Project

- SAEL at the corporate level has dedicated ESMS which provides measures on occupational health and safety which will be implemented at the site level. SAEL has developed Checklists, templates, plans with respect to OHS as part of their ESMS. The checklists, templates, plans in line with OHS include the following:
 - EHS Audit Checklist
 - PPE Checklist
 - EHS Training Template
 - Incident Reporting and Investigation
 - Emergency Response Framework
 - Training and Competence

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- Project SPVs will provide Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks to all its workers.

6.7.2.2.3 Impact Magnitude

Since occupational health and safety risks will be confined to project site, the spread has been categorized as local. Furthermore, since the operation phase will last for longer period i.e., 25 years, the duration of occupational health and safety risks during operation has been classified as permanent and the intensity has been classified as moderate. Therefore, the impact magnitude has been classified as **Substantial**.

The workers at site may be exposed to possible fire hazards, physical hazards, and chemical hazards, if adequate training, awareness, and management measures are not communicated to the workers. Therefore, the probability of incidence occurrence has been categorized as **unexpected to possible**.

6.7.2.2.4 Proposed Mitigation Measures

- All workers (regular and contracted) should be provided with training on Health and Safety with appropriate refresher courses throughout the life cycle of the Project
- All workers to comply with the code of conduct as developed by the client.
- A site-specific training calendar should be developed and implemented onsite
- Hospital tie up with nearby hospital should be done
- Adequate fire safety system including fire extinguishers, sand buckets should be provided on site
- Safe drinking water supply should be provided for the workers
- An up to date first aid box should be provided at site and a trained person should be appointed to manage it
- The site-specific occupational health and safety plan and emergency management plan should be implemented at the project location
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks should be provided to the workers. A PPE inventory should be maintained onsite
- Structural integrity should be checked before undertaking any work
- Electrical and maintenance work should not be carried out during poor weather
- Annual health checkup of workers should be undertaken

	Nature of Impact	Spread of Impact	Duration	Intensity	Frequency	Probability of Incidence Occurrence	Significance of Impact
Without Mitigation Measures	Negative	Local	Permanent	Moderate	Routine	Unexpected to Possible	Substantial
With Mitigation Measures	Negative	Local	Short	Moderate to Low	Routine	Unexpected	Small to Negligible

6.8 Climate Risk and Adaption Assessment

The Ministry of Environment and Forests called upon the States to expeditiously prepare the State Action Plans on Climate Change consistent with the strategy outlined in National Action Plan on Climate Change (SAPCC) for Andhra Pradesh. The SAPCC is a dynamic and flexible policy framework which will follow a continuous interactive process to reflect the changes and developments happening at the national, State and local levels. The stakeholders' consultation process is an important aspect of SAPCC. Stakeholder engagement and consultation aligns them into the planning framework, and broadens and deepens perspectives and involvement in implementation of the State Action Plans for building a climate resilient economy. This SAPCC has been designed following stakeholders' concerns and issues.

A detailed diagnostic study, following the UNDP (United Nations Development Programme) methodologies (UNDP Adaptation Policy Framework and Human Development Index) has been performed to assess the climate change vulnerability profile of Andhra Pradesh. It is based on the basic hypothesis that climate change vulnerability of a region is a function of two key variables:

- Adaptive capacity of the region
- Physical exposure of the region to climatic events.

An index has been developed to estimate these two parameters. 16 major sectors which are seriously impacted by CC (agriculture, coastal zone, disaster management, rural development, transport, energy, industry, tourism, mining, forestry and biodiversity, urban development and waste management, health and family welfare, animal husbandry, fisheries, irrigation and water) have been identified for the State.

The Andhra Pradesh State Disaster Management Plan (APSDMP)⁵² provides a framework and guidance to the State Government agencies and other stakeholders for managing the disasters, in accordance with the provisions of the DM Act 2005. The APSDMP is being revised and upgraded annually, by incorporating the lessons learnt from the recent disasters that occurred in the State and also the best practices adopted elsewhere towards disaster management. The plan has been prepared by carefully incorporating the guidance given in the National Policy on Disaster Management (NPDM-2016), Prime Minister's 10 Point Agenda for Disaster Risk Reduction and SENDAI Framework for DRR (2015-30). This Plan has been developed aligning to the National Disaster Management Plan (NDMP-2019).

The key objectives of the APSDMP are enlisted below.

- Assess various hazards, vulnerability, capacity and risk associated with state;
- Lay down various measures and guidelines for prevention and mitigation;
- Lay down preparedness measures for all stakeholders;
- Build the capacity of all stakeholders in the state to cope with the disaster and promote community based disaster management;
- Mainstream disaster management concerns into the developmental planning process;
- Develop efficient, streamlined and rapid disaster response and relief mechanisms in the state;
- Provide clarity on roles and responsibilities for stakeholders involved in various phases of disaster management.
- Ensure co-ordination and promote productive partnership with all other agencies related to the disaster management; and
- Commence recovery program as an opportunity to build back better in case of a future disaster by incorporating community participation in the program.

The present assessment is a high-level qualitative screening exercise, involving application of scientific principles, and professional judgement based on the best available data sources and information in the open source. The Area of Assessment for the Climate Risk and Adaptation Assessment (CRA) was selected to include the major project components from proposed solar project (hereinafter referred to as 'Key Assets') as presented in **Table 6-12**.

Table 6-12 Key Project Assets

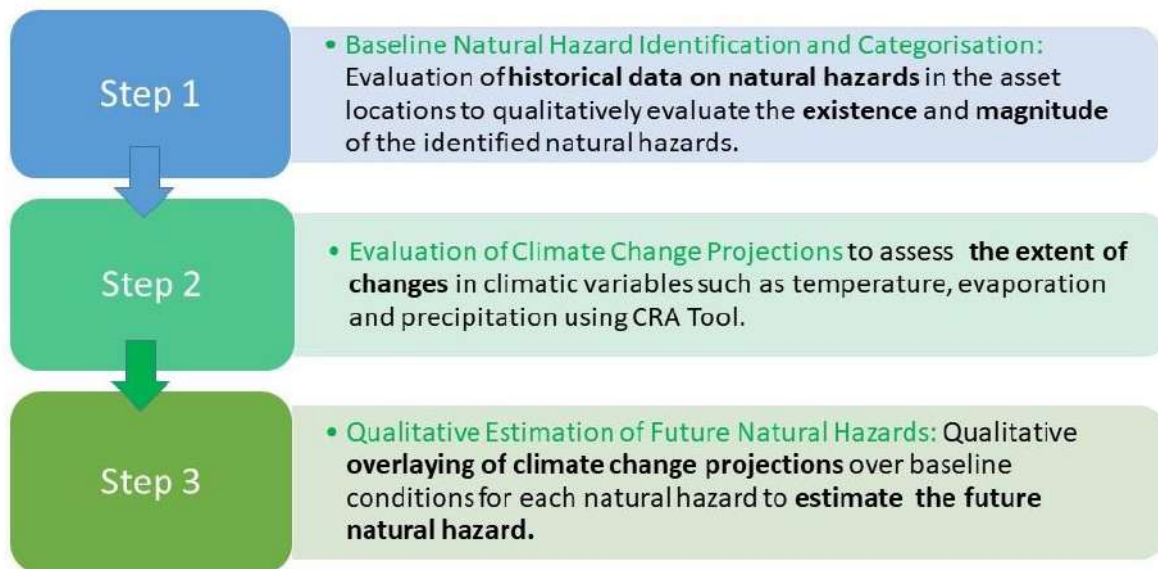
Study Area	Major Components
300MW Solar power project	1. PV Modules
	2. Transmission Line
	3. Inverter
	4. Storage Room
	5. Site Office
	6. Access Road

⁵² <https://apsdma.ap.gov.in/files/4afe4671523e4dae338d84cc9560ccde.pdf>

As a part of this assessment following natural hazards were evaluated under baseline and climate change conditions using a stepped approach as presented in **Figure 6:1** below. Based on the location of the study areas and general topography, hazards due to coastal flooding, sea level rise and landslides were not evaluated in the present assessment.

- Water Availability
- Riverine Flood
- Extreme Heat
- Cyclone
- Wind Speed
- Thunderstorm and Lightning

Figure 6:2 Approach for the Present Assessment



Representative Concentration Pathways (RCPs) are climate change scenarios that show future greenhouse gas concentrations and have been formally adopted by Intergovernmental Panel on Climate Change (IPCC). The four RCPs (RCP2.6, RCP4.5, RCP6, and RCP8.5) are named according to the range of radiative forcing values (2.6, 4.5, 6, and 8.5 W/m², respectively) projected for the year 2100. Higher RCP values mean more emissions, leading to higher temperatures and greater climate change effects. Lower RCP values are preferable but demand stronger mitigation efforts. The likely changes in above hazards due to climate changes were evaluated qualitatively for climate change scenarios of RCP 4.5 and RCP 8.5 during timeframes for 2030 and 2050, using Coupled Model Intercomparison Project (CMIP-5) Climate Change Projections following the TCFD guidelines as recommended. The likely changes in hazards are based on application of specific principles, professional judgments and likely relation between natural hazards and the climate parameter.

The overall assessment indicated that Water Availability is likely to 'Medium' hazard under baseline and 'High' under climate change conditions. Extreme Heat is likely to 'High' hazard under baseline and climate change conditions. Cyclone and Wind speed Indicated 'Medium' hazard under baseline and 'High' hazard in climate change conditions. Riverine Flood is likely to 'Low' hazard under baseline and climate change conditions.

6.8.1 Water Availability

As per WRI-Aqueduct, the baseline water stress indicates 'High' for study area⁵³. Higher water stress may be considered to indicate high competition for common water resource or lower availability of water in the area. Hence, the baseline hazard due to water stress is categorized to be 'high'. Seasonal Variability indicates 'Medium' for the study area. As per the information provided by

⁵³ According to WRI the "Overall water risk"⁵³ is a measures of all water-related risks, by aggregating all selected indicators from the Physical Quantity, Quality and Regulatory & Reputational Risk categories. Higher values indicate higher water risk. According to the Aqueduct tool of WRI, the study has been categorized as "High" Stressed area.

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CGWB in the Dynamic Groundwater Resources of India (2023), the proposed Project fall in an area categorized as Safe in terms of groundwater development and extraction, which means less than 70% of groundwater extraction in the area.

Overall hazard towards water availability under baseline conditions is considered to be **'Medium'**.

Projections for water stress and seasonal variability from WRI-Aqueduct were evaluated for RCP 4.5 and RCP 8.5 scenario for timeframes of 2030 and 2050. Climate change projections for water stress indicates 'High' for all study areas under all climate scenario and timeframes. Whereas seasonal variability under all climate change scenarios and timeframes indicated as 'High' in all study areas. Accordingly, overall hazard towards water availability under all climate change scenarios and timeframes is considered to be **'High'**.

6.8.2 Riverine Flood

As per Think Hazard Tool⁵⁴ and secondary information, Anantapur and YSR district riverine flood hazard is classified as low. According to the BMTPC's State of Andhra Pradesh flood hazard, the study area is situated in close proximity to a flood-prone area. Similarly, WRI-Aqueduct projections for flood at 100-year return period indicated 'low' riverine flooding in any of the study areas. Accordingly, **'low'** riverine flood hazard is considered for the entire study area under baseline conditions.

Riverine flood hazard under climate change conditions was evaluated based on the projections from WRI-Aqueduct Flood Tool for a 100-year return period flood for RCP4.5 and RCP8.5 for 2030 and RCP4.5 and RCP8.5 for 2050, respectively. Accordingly, low flooding was projected for the Solar plant and no flooding was projected for Transmission Line under all climate change scenarios and timeframes. Hence, **'low'** hazard due to riverine flood is considered for all study areas.

6.8.3 Extreme Heat

The extreme heat hazard was evaluated on a regional level using the Think Hazard report for study area (ThinkHazard, 2020). The extreme heat hazard at all assets in study area is reported to be 'High'. Media reports indicated that the maximum day time temperature to often exceed 43.3°C in the region. Accordingly, the extreme heat hazard for all the study is considered to be **'High'** under baseline conditions.

In the absence of projections for wet bulb globe temperature the hazard due to extreme heat in future was evaluated based on projections for maximum temperature, extreme temperature, and warm spell duration index (WSDI). Climate change projection indicate increase in maximum daily temperature, and warm spell duration. Climate change projections indicate an increase in average maximum daily temperature by 1.46°C by 2050 and increase of 25 to more than 114 days in warm spell duration. This indicates an increase in extreme temperatures and its duration which are likely to remain high. Hence, the hazard due to extreme heat for all study areas is considered to remain **'High'** in future, under all climate change scenarios.

6.8.4 Cyclone

As per Cyclone occurrence map of India, no historical cyclones are reported in the study area. Hence, no cyclone hazard at all assets within the study area was considered. Based on the ThinkHazard data, the cyclone hazard classification indicates a high risk based on available information. NOAA cyclone tracks data reveal that twelve cyclones have passed within approximately 100 km of the study area. The baseline assessment categorizes the hazard posed by cyclones as **'Medium'** across all assets within the study area.

As per ThinkHazard⁵⁵, Global average tropical cyclone wind speed and rainfall is likely to increase in the future, and the global average frequency of tropical cyclones is likely to decrease or remain unchanged. It is possible that the frequency of the most intense tropical cyclones will increase substantially in some ocean regions (IPCC, 2013). The present hazard level in areas currently affected by tropical cyclones may increase in the long-term. Projects located in such areas should be robust to future increases in cyclone hazard. However, considering historical cyclone occurrences and inland location of the study areas, the hazard due to cyclone under climate change scenario is considered to **'High'**.

⁵⁴ <https://thinkhazard.org/en/report/17548-india-andhra-pradesh-anantapur/EH>

⁵⁵ <https://thinkhazard.org/en/report/1485-india-andhra-pradesh/CY>

6.8.5 Wind Speed

According to the BMTPC, Andhra Pradesh State Disaster Management Plan and secondary information, Anantapur and YSR districts are categorized as Moderate Damage Risk Zone, indicating medium wind hazard at all the study areas (wind speed of 39 m/s). Therefore, from a hazard standpoint, the overall baseline wind hazard in all study areas is deemed to be 'Medium'.

The climate models for wind speed indicate a high degree of uncertainty with models projecting increase, decrease, or no change in the future. However, a recent study indicated rapid increases in wind speed across the globe since 2010 (Zeng et al., 2019)⁵⁶. Considering the limited information available on wind speed projections and high uncertainty, the wind hazard under a climate change scenario and as per recent study is considered too 'Medium'

6.8.6 Thunderstorm and Lightning

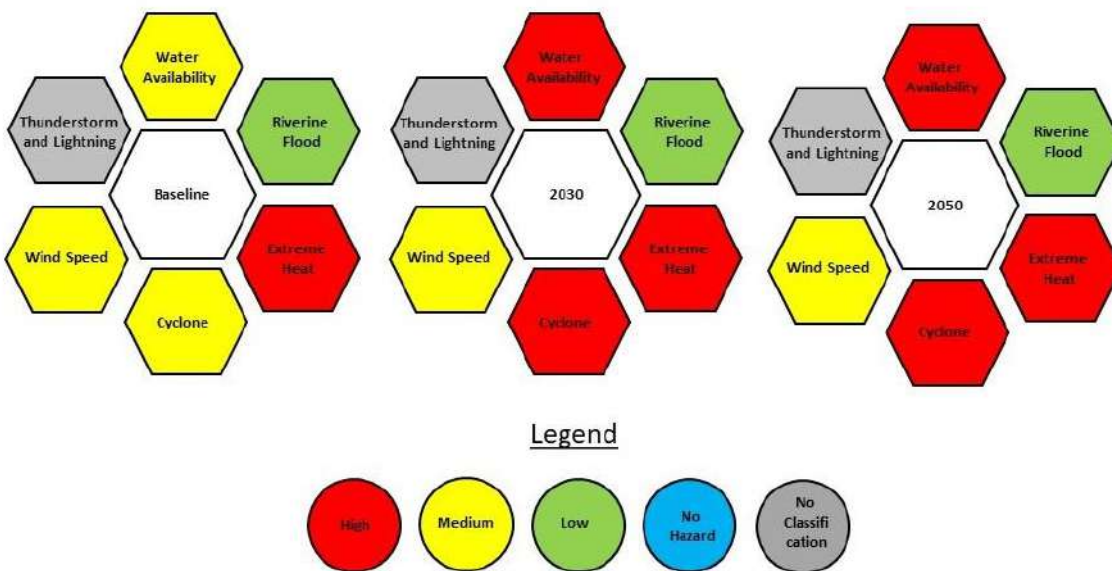
As per BMTPC, the locations around the study were reported historical occurrences of thunderstorm in the range of 20-28 during the period of 1981- 2010. These hazards are evaluated to present the historical events and provide an understanding on different types of hazards likely to be experienced at the study areas as 'Low'.

There are no direct projections available for lightning. However, as lightning usually occurs during thunderstorms, any changes in occurrences of thunderstorm are considered as measure for changes in lightning in future.

6.8.7 Hazard Summery and Implications

The overall assessment indicated that Water Availability is likely to 'Medium' hazard under baseline and 'High' under climate change conditions. Extreme Heat is likely to 'High' hazard under baseline and climate change conditions. Cyclone and Wind speed Indicated 'Medium' hazard under baseline and 'High' hazard in climate change conditions. Riverine Flood is likely to 'Low' hazard under baseline and climate change conditions. **Figure 6-3** presents the summery of natural hazards under baseline and climate change scenarios of RCP 4.5 and RCP 8.5.

Figure 6-4: Summary of Natural Hazards under Baseline and Climate Change Scenarios of RCP 4.5 and RCP 8.5



As per the scope of work, a Climate Risk and Adaptation Assessment (CRA) has been undertaken and detailed assessment is presented in the separate CRA report.

⁵⁶ Zeng, Z., Ziegler, A. D., Searchinger, T., Yang, L., Chen, A., Ju, K., and Wood, E. F. (2019). A reversal in global terrestrial stilling and its implications for wind energy production. Nature Climate Change, 9, 979-985. doi: <https://doi.org/10.1038/s41558-019-0622-6>

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6.9 Cumulative Impact

The proposed project is situated in Koduru village, Kondapuram tehsil, YSR District, and Bodaipalle village, Tadipatri tehsil, Anantapur District, Andhra Pradesh, as detailed in Section 2.1. The study area includes several operational renewable energy projects, along with one operational steel plant and one cement plant, as outlined in Section 4.2.

According to the project team and secondary published data, no new or upcoming projects have been reported within the study area. Since the existing operational projects and its impacts are already incorporated within the current baseline assessments, and their associated impacts are addressed within this ESIA, a separate Cumulative Impact Assessment is not considered necessary in this study.

7 Environment & Social Management Plan

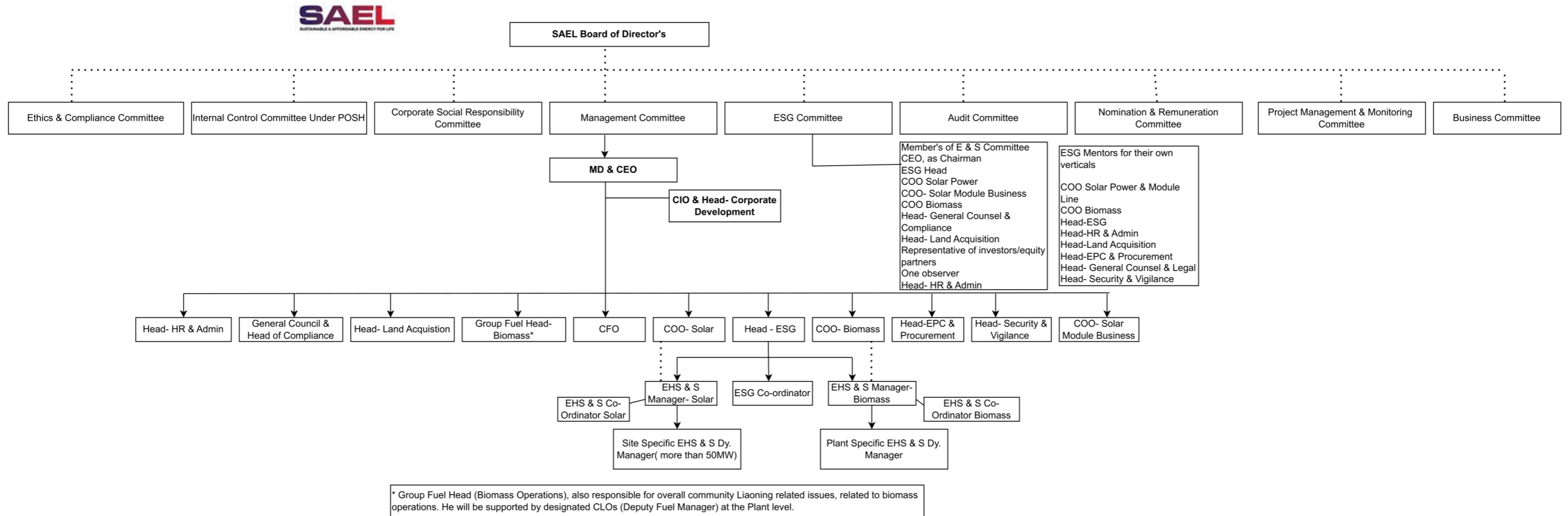
This section presents the Environmental and Social Management Plan (ESMP) for the Project. The purpose of this ESMP is to specify the standards and controls required to manage and monitor environmental and social impacts during construction and operation phase. To achieve this, the ESMP identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative effects on the physical, natural and social environment. This is in accordance with the applicable reference standards which emphasizes the importance of managing social and environmental performance throughout the lifecycle of the project.

7.1 Project Organizational Structure

To ensure the efficacy of Environmental and social management plan, certain institutional mechanism with well-defined roles and responsibilities is essential for effective implementation of identified mitigation measures both during construction and operation phases.

Project SPVs will have ultimate responsibility for implementing the provisions of the ESMP. This role will include the on-going management of environmental and social impacts, monitoring of contractor's performance as well as development of mechanisms for dealing with environmental and social issues. Project SPVs will also ensure that the activities of its contractors are conducted in accordance with good practice measures, implementation of which will be required through contractual documentation.

Figure 7:1 Project Organization Structure



Source: SAEL

The EHS&S team will be responsible for co-ordination of the actions required for environment and social management and mitigation and for monitoring the progress of the proposed ESMP for the project.

7.1.1 Roles and Responsibilities

The EHS&S team will be headed by Project Head. An outline for responsibilities of the proposed EHS&S team is given below

Role	Responsibility
EHS&S Manager	<ul style="list-style-type: none"> Develop & Execute EHS&S plan & fulfill ESG requirement in the workplace according to legal & company's guidelines. ESMP Implementation as per ESIA/ESIA at Site. Allocating EHS&S representatives at the Job location. Promoting HSE&S awareness among the staff and workmen. Monitoring and benchmarking EHS&S performance. Organize EHS&S Committee' meeting for reviewing EHS&S performance of project. Ensuring appropriate EHS&S training is provided to all employees. Assessing subcontractor compliance with EHS&S Plan. Initiation of accident & incident investigation and maintain injury register Ensure legal register maintained and complied as per regulation Gender Issues
EHS&S Deputy Manager	<ul style="list-style-type: none"> Prepare & implement Site EHS & S Plan comprising of contractor's EHS&S Plan. EHS&S implementation in consultation with the site head/Site safety in charge. EHS&S Audit – Planning organizing and following up for closing of critical observations. Investigate incidents & unsafe acts & Formulate a mechanism for closure of such practices. Training and awareness of cross functional staff & displaying awareness posters depicting valuable EHS&S communication. Ensuring Effective implementation of ESMS and Safety Management system at the Site Prepare and Implement Disaster Management Plan & Emergency Response Plan. Audit HIRA / JSA, PTW implementation at the workplace. Celebration of Events like World Environment Day, National Safety Day, Road Safety Week & other related days. Providing assistance to business EHS&S head in designing EHS&S protocols. Updating & Reviewing of Legal Register.
EHS&S Senior Officer	<ul style="list-style-type: none"> Assist in Implementation of EHS&S Plan. Promotion and stimulation of high level of EHS&S awareness at all the time. Assisting subcontractors and employees with the provision of EHS&S advise. Assess the planned work for potential hazards in consultation with employees. Participating in EHS&S meeting and EHS&S Programs. Daily inspection of project activities and suggest corrective measures. Participation in accident investigation
Project Head	<ul style="list-style-type: none"> Implementation of on-site procedures related to the E&S Tracking of E&S compliance related aspects for regulatory and lenders' requirements

	<ul style="list-style-type: none"> • Ensuring incident reporting to corporate level • Identifying training and capacity building needs at Plants and coordinating with HR on training • Supervision of implementation of the ESMP, management plans. ESMS and other action plans developed for the Plant • Communication and reporting to corporate level. • Development of KPI's, resolution of issues and managing the manpower and the project. • Overall monitoring of the Grievance Redressal Mechanism process.
HR/Admin In charge	<ul style="list-style-type: none"> • Initiate local labour recruitment and management, and • To conducting meetings with the local communities (if required)
Designated Community and Liaison Officer (CLO)	<ul style="list-style-type: none"> • Responsible for ongoing and future consultation/engagement with stakeholder engagement • Head of project specific grievance redressal mechanism and will implement the provision of Grievance Redressal Mechanism • Support local labour recruitment and management as per the feedback receive during consultation • To coordinate with the State regulatory authorities for environmental approvals / permits • Liaison and coordinate with the local community, local administration, police, medical facilities, fire station, etc. • Liaising with government authorities for determination of market value of the land towards payment of compensation for TL and for determination of crop / Tree loss
Land Aggregator	<ul style="list-style-type: none"> • Responsible for identifying the land parcels for the proposed solar plant and TL • Involved in collecting revenue records of the required land • Conducting Legal due diligence and review of land mutation history • Obtaining consent from the landowners • Responsible for executing ATL and lease deeds • Responsible for converting land use to NA land. • Liaison with Revenue departments in executing lease deeds and for determination of land value..

7.2 Existing Policies and Management Plans at SAEL⁵⁷

- **Environmental and Social Management System:** : SAEL has successfully established the Environmental and Social Management System (ESMS) in strict accordance with the requirements stipulated by the International Finance Corporation Performance Standards (IFC PS) and Asian Development Bank Safeguard Policy Statement (AIIB ESP) at the corporate level. This ESMS has been effectively implemented and integrated into SAEL's existing biomass-based power plants and solar power plants, ensuring that environmental and social considerations are an integral part of their operations. Further, the ESMS shall be implemented at the proposed Project. The main content of the ESMS includes:
 - Leadership and accountability through Policy
 - Defined objectives, targets, criteria and actions for the management of potential impacts
 - Identify and provide access to legal requirements and other obligations
 - Identified associated impacts and risks associated throughout the Project Life
 - Established roles and responsibilities for implementation of ESMS & providing sufficient management sponsorship of human resources
 - Considered E&S management and performance in the selection and management of third-party services
 - Requirement of competence, training and awareness
 - Implementation of operational controls and maintain equipment to uphold E&S performance and compliance and to manage impacts and risks
 - Procedure for controlling and maintained documents and records associated with E&S management
 - procedures for assessing, correcting and improving performance
- **EHS Policy:** SAEL has formulated an EHS policy along with the EHS Management Process. SAEL is developed with an objective with a commitment to practice safe working methods to prevent occupational health and safety risks and adopt clean technologies to prevent pollution
- **Corporate Social Responsibility (CSR) Policy:** SAEL has established a CSR Policy in line with the Companies Act, 2013, which encompasses its philosophy and guides its sustained efforts for undertaking and supporting socially useful programs for

⁵⁷ As reported, SAEL's policies will be applicable on the Project

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the welfare and sustainable development of the society. The policy commits to prioritize its CSR activities around six (6) focus area of work, which include, a) Rural Transformation, b) Health, c) Education, d) environment, e) Animal Welfare, f) disaster response

- **Recruitment and Selection Policy:** SAEL has established a recruitment and selection policy, wherein SAEL as company has committed that the best people are recruited on merit and the recruitment process shall be free from any form of biasness and discrimination. Further, the main objective of the policy is to establish the standards, methods & controls for the internal as well as the external recruitment process.
- **Other Governance practices and policies:** Other Governance policies include a) Code of Conduct for workers, b) Policy on Sexual Harassment of Women at Workplace (*in line with The Sexual Harassment of Women at Workplace (Prevention, Prohibition & Redressal) Act, 2013*), c) Anti bribery & Anti-Corruption Policy, and d) recruitment & selection policy

7.3 Review and Reporting

The project will develop and implement a programme of regular reporting through the stages of the project lifecycle. The personnel delegated EHS roles shall be required to fully comply with the monitoring programmes in terms of timely submissions of reports as per acceptable level of details. Reporting will be done in form of environmental checklist, incident record register, training records, and environmental check list, incident record register, training records, etc.

7.4 Environmental and Social Management Plan

This section outlines the potential impacts, mitigation measures, monitoring and management responsibilities during construction and operation phases of the Project. The purpose of ESMP is to:

- Provide an institutional mechanism with well-defined roles and responsibilities for ensuring that measures identified in ESIA designated to mitigate potential impacts are implemented
- List all suggested mitigation measures and control techniques, safeguards identified through the ESIA process
- Provide project monitoring program to effective implementation of the mitigation measures and ascertain efficacy of the environmental and social management and risk control system in place
- Assist in ensuring compliance with all relevant legislations at local, state, and national level for the Project.

Table 7-1 Environmental and Social Management and Monitoring Plan

S.No.	Environmental/ Social Resources	Impact/Issues	Applicable Technical details of mitigation measure	Mitigation Measures	Responsibility for ensuring implementation of the suggested mitigation	Means of verification that mitigation has been met	Timeline/Frequency of Monitoring	Responsibility for implementation of monitoring	Supervision responsibility	Reporting Requirements
Pre-construction Phase										
General Provisions										
1.		Clauses to include ESMP implementation within contractor's agreement	The mitigation measures is to ensure that the construction and operation work undertaken by the Contractors shall be in compliance with the ESMP's requirement and is one (1) time event during the onboarding of the contractor. However, the monitoring of contractor shall be in continuous in nature.	<ul style="list-style-type: none"> The clauses for implementation of ESMP shall be included in the contractor's contract agreement The clauses for adherence to SAEL's ESMS should be also included in the contractor's agreement. A monitoring mechanism shall be developed by SAEL to monitor the implementation of the ESMS as well as construction and operation phase ESMPs by the contractors 	SAEL Project Management team	compliance reports by contractor to Project EHS representative and EHS audits on site by Project EHS representative	Monthly	Project EHS representative of SAEL	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
Construction and Operation Phases										
General provisions										
2.		Compliance Register	Development of compliance register is one (1) time event. However, implementation and updating of compliance register is a continuous requirement	<ul style="list-style-type: none"> Project SPV will maintain a compliance register during both construction and operation phases which will be guided by SAEL's legal register at the corporate as well as the applicable permits, licenses and regulations presented in Chapter 3 of this report. 				Project EHS representative	SAEL EHS Head at the corporate level	Report from Project team to corporate EHS team
Physical Environment										
3.		GHG Emissions	The recommended mitigation measure will promote will evaluate technically and financially feasible and cost-effective options to reduce or offset project-related greenhouse gas emissions during project design and operation, and pursue appropriate options.	<ul style="list-style-type: none"> Project SPV to carry out an Inventorization/calculation of carbon emissions (GHG Emission, including Scope 1 & Scope 2 emission) being generated on account of various activities, such as construction/upgradation work, traffic movement, and maintenance work. The carbon foot printing exercise can clearly indicate the intervention areas where reduction in carbon emissions is possible/required. Project SPV to report GHG emissions to SAEL at corporate level on annual or bi-annual basis. 	Project Head	Inventoried GHG emissions	Bi-Annual/ Annual	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
Socio-economic										
4.	Impact on Local community and agricultural field due to Solar Plant Site and proposed transmission line	loss of agricultural land for formal and informal land users along with restriction on access	Development of Livelihood Restoration Plan	<ul style="list-style-type: none"> Procure the land in accordance with the applicable reference framework of this report Preparing a Livelihood Restoration Plan (LRP) for the Solar Plant Site and Transmission Line project to ensure that communities affected by the project are adequately supported and their livelihoods are restored or improved The lease rate shall be based on the AP Renewable Energy Export Policy Amendment dated 13-09-2022, which considers maximum compensation to the landowners. If any of the land parcel belongs to women landowner, compensation shall be paid to the actual women owner of the land, not to their male counterparts. Moreover, if any land parcel belongs to minor (under 18), compensation to the right person shall be paid as per India law in this regard to avoid discrimination of vulnerable groups Construction of transmission line during the non-crop cultivation person i.e., May and June – so that the construction will not result in loss of standing crops Timely sharing of project related information with all relevant stakeholders Provision of site-specific SEP and Grievance Redressal Mechanism (GRM) to all impacted stakeholders for community engagement and raise/register their grievances. 	Project transmission line and land team	Records of payment of compensation and consultation with impacted farmers	Prior and during the construction of Plant site and transmission line	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

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5.	Impact due to Influx of Migrant Workers	As reported by the Project, during the construction phase of the Project, ~200 migrant construction workers will be employed at the project. The project and its contractor will give preference is employing local workforce. However, solar power project requires specialized skill force, hence migrant workforce to be deployed based on the requirements.	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> • Employment of local labour: the project and its contractor shall provide preference in employing the local workforce. • Managing Project induced in-migration (refer to Table 6-5) • Labour assessment shall be carried out at different level, depending on the initial assessment of the project risk posed by labour practices, it may take place as part of a regular monitoring and auditing of on-roll workers and contractual workers. The labour assessment should include a review of the employment policies, the adequacy of existing policies, and management's capacity to implement (refer to Table 6-6) • Stakeholder engagement and Grievance Redressal – development and use of appropriate communication media and messaging beyond the immediate project area of influence (refer to Table 6-7) 	Appointed contractors and EHS&S professional of Project SPVs	Consultation with labour and local community	Quarterly during the construction phase and half yearly during operation phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional at the site level, and then to SAEL – EHS&S Head
6.	Impact Due to Stress on Local Resources	The influx of migrant workers may not have significant impact on usage of local resources as they will be absorbed within the city, there may still be impacts, including an increased demand on transport system, inflationary effect on housing renting markets, food and fuel, and potential increase in social conflict and criminal activity.	The required mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> • Managing Project Induced In-migration (refer to Table 6-8) • Establish and implement stakeholder engagement and grievance redressal mechanism (refer to Table 6-9) 	Appointed contractors and EHS&S professional of Project SPVs	Consultation with local and local community Records of stakeholder engagement and reported grievances	Quarterly during the construction phase and half yearly during operation phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional at the site level, and then to SAEL – EHS&S Head
7.	Impact on local economy and employment	The construction and operation phases of the project will generate employment opportunity for skilled, semi-skilled and unskilled labour and domestic businesses	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<p>While the significance of the impact on economy, employment opportunities and local business opportunities is understood to be positive, the following measure should be put in place to ensure that the local community receive maximum benefit from the presence of the Project:</p> <ul style="list-style-type: none"> • Preference should be provided to local labour. based on availability of local labour, and skillset and knowledge. • Project shall provide equal access to both female and male local population in available employment opportunities and for greater employability of residents. • The project proponent will establish a mechanism to audit sub-contractors and suppliers with respect to compliance of utilizing local labour and resources 	Appointed contractors and EHS&S professional of Project SPVs	Consultation with local community	Quarterly during the construction phase and half yearly during operation phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional at the site level, and then to SAEL – EHS&S Head
8.	Contractor and supplier management	The Project will appoint contractors Engineering, procurement and construction (EPC) and other sub-contractors to undertake the construction work for the Project. If not managed effectively, appointment of contractors will raise EHSS risks for the Project.	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> • Implement contractor management approaches (refer to Table 6-10) • Implement supplier management approaches (refer to Table 6-11) 	Appointed EHS&S and contractor management professional of Project SPVs	Review the records of implemented approaches	Prior to appointment of contractor and supplier Quarterly during the construction phase and half yearly during operation phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from EHS&S professional at the site level, and then to SAEL – EHS&S Head

9.	Gender-based violation and harassment	The migration of male workers may have a potential high-risk of GBVH affected local community member and other workers	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	Project shall incorporate following procedure to address the potential risks of GBVH in construction phase:	Appointed contractors, EHS&S professional, and Human resource department	Monitoring reports, and consultation with labour	Quarterly during the construction phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional/HR department, and then to SAEL – EHS&S Head
Construction Phase										
Physical Environment										
10.	Land use	The project activities such as installation of solar modules, construction of internal roads is expected to alter the land use throughout the project life cycle	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> Construction activity should be restricted to designated area; On completion of the construction activities, land used for temporary facilities will be restored to the extent possible; The land use around the permanent project facilities should not be disturbed. Demarcated roads should only be used for transportation purpose Waste litter should be avoided in and around the project area 	Contractor’s EHS representative	Visual Observation and EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	-
11.	Topography and Drainage	The topography of the Project land may be altered slightly due to the minor levelling, excavation work at the solar site, development of internal roads within the plant and development of SCADA and site office.	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> Levelling and grading activities should be carried out with as little disturbance to the existing contour as possible, in order to retain the general slope of Project site SAEL will ensure that developer will not alter the flow and drainage pattern during installation of the solar panels. And same shall be included as a condition in EPC contractor bid document. According to the drainage map of the study area (Figure 4:22), the project site encompasses both drainage channels and natural water bodies. Therefore, Cross-drainage channels should be incorporated into the design to maintain the flow of natural drainage. Cross-drainage channels should be incorporated into the design to maintain the flow of natural drainage. Develop a comprehensive stormwater management plan to manage runoff and prevent excess water from accumulating in the project area. This could include the 	Contractor’s EHS representative	EHS Inspection	During site levelling and excavation work	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

			installation of permeable surfaces and rainwater harvesting systems to reduce surface runoff.							
			<ul style="list-style-type: none"> Drainage lines should be designed to direct excess water away from sensitive areas, ensuring that the natural topography and water flow are respected and not altered during the site preparation and construction stage. According to Section 4.2.2.12, the project area is subject to medium flood and wind risks. However, as noted in Sections 6.8.2 and 6.8.5, the potential impact has been assessed as low to medium, indicating that flood management measures may not be essential. Nonetheless, if the decision is made to implement flood management strategies, it would be prudent to incorporate elevated foundations, efficient stormwater drainage systems, and flood barriers to mitigate any potential local flood risks and enhance site resilience. Uncontaminated spoil generated from excavation work should be reused to the extent possible for backfilling purpose, restoration of contaminated location within project boundary etc. Spoils which cannot be reused should be disposed through authorized vendor 							
12.	Air Quality	<ul style="list-style-type: none"> Particulate, fugitive, and vehicular emission 	<p>The project will install transit mixer, heavy motor vehicles at site which will result in fugitive, particular and vehicular emissions. Therefore, continuous implementation of the mitigation measures will help to curb air emissions.</p>	<ul style="list-style-type: none"> Speed of vehicles on site will be limited to 10-15 km/h which will help in minimizing fugitive dust emissions due to vehicular movement. Emissions from the D.G. set and other stationary machines will be controlled by ensuring that the engines are always properly tuned and maintained. Stack height of DG sets should be in line with the CPCB norms Minimize stockpiling by coordinating excavations, spreading, re-grading and compaction activities Cease or phase down work if excess fugitive dust is observed. Investigate the source of dust and ensure proper suppression measures; Idling of vehicles and equipment must be prevented In case of complain on dust emission from site, Project SPD along with the contractors should reconsider the construction technique and conduct regular water sprinkling (as appropriate) to suppress dust emission Burning of waste at the construction site should be strictly prohibited All stockpile materials which are likely to generate airborne fugitive dust will be covered with canvas or plastic sheets during windy season Water sprinkling at the dust emitting areas should be undertaken as and when required. Construction materials and soil heaps should be covered Vehicles and machineries should be regularly inspected and maintained Prefabricated materials should be used to the extent possible to minimize localized air pollution Use Paved roads to the extent possible Only PUC certified vehicles should be deployed for the Project Air quality monitoring should be conducted during peak construction activities in and around project site, in line with SAEL ESMS 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
13.	Noise Quality	<ul style="list-style-type: none"> Impacts on receptors due to noise during construction phase 	<p>The project will install transit mixer, heavy motor vehicles at site which will result in noise emissions during peak construction. Therefore, continuous implementation of the mitigation measures will help to curb noise emissions during project construction.</p>	<ul style="list-style-type: none"> Only well-maintained equipment should be operated on-site; Acoustic enclosures should be provided for all the noise emitting machineries to reduce noise levels at the nearby settlements If it is noticed that any particular equipment is generating too much noise then lubricating moving parts, tightening loose parts and replacing worn out components should be carried out to bring down the noise and placing such machinery far away from the households as possible; Limit the number of heavy vehicles required for the Project to only those that are necessary; 	Contractor's EHS representative	Visual Observation and EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

- Machinery and construction equipment that may be in intermittent use should be shut down or throttled down during non-work periods;
- Minimal use of vehicle horns and heavy engine breaking in the area needs to be encouraged.
- Noise limits for construction equipment to be installed at the project area during peak construction such as front loaders concrete mixers, cranes (moveable), will not exceed 55 dB (A), measured at one meter from the edge of the equipment in free field, as specified in the Environment (Protection) Rules, 1986.
- Conduct noise monitoring once or twice during peak construction activities in and around the project site.

14.	Soil Environment	Soil Erosion and Compaction	The construction activities at the project site will lead to limited levelling, excavation work, piling work, laying of cables which will remove top soil at the project area which may cause soil erosion and compaction depending on type of soil. Therefore, continuous implementation of the mitigation measures will help to curb soil erosion and contamination during project construction.	<ul style="list-style-type: none"> • Stripping of topsoil shall not be conducted earlier than required (vegetation cover will be maintained for as long as possible) in order to prevent the erosion (wind and water) of soil; • Top soil that has been stripped should be stored for landscaping of the site; • The stock piles of the soil should be kept moist/covered to avoid wind erosion of the soil; • Soil to be ploughed in compacted area after completion of the construction work; • As a best practice, site clearance, piling, excavation and access road strengthening will not be carried out during the monsoon season to minimize erosion and run-off. • Site to be restored at the end of construction phase. • In accordance with Section 6.5.1.5.1, the following soil control measures are recommended for implementation: • Perform detailed geotechnical assessments to ensure safe excavation, especially in shale areas, to prevent landslides. Use retaining structures where needed to keep slopes stable and protect the ground. • Implement erosion control strategies, including terracing, vegetative cover, and silt fences, to prevent soil erosion during site preparation, thereby preserving soil quality and reducing environmental impact. • Tailor foundation designs to the specific soil conditions, employing advanced techniques such as deep piling or soil compaction in areas with low to medium soil bearing capacity, ensuring the structural stability and longevity of the development. 	Contractor's EHS representative	Visual Observation and EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
15.	Soil Environment	Soil Contamination	The construction activities at the project site will lead to storage of materials and hazardous and nonhazardous wastes on site which may cause leakage into the soil causing soil contamination. Therefore, continuous implementation of the mitigation measures will help to curb soil contamination during project construction.	<ul style="list-style-type: none"> • EPC Contractor should ensure that no unauthorized dumping of used oil and other hazardous waste is undertaken at the site • Designated areas within the project premises should be provided for Solid Municipal Waste. • An authorized third party vendor should be engaged to collect municipal solid waste from the site on daily basis. Implement a municipal waste collection schedule through identified authorized vendor with sufficient frequency to avoid accumulation of garbage. • Cover collection and transfer vehicles along the entire route of transport to avoid windblown litter; • Waste water generated from site office should be disposed in septic tank/soak pits. Project SPDs should identify an authorized vendor for cleaning of the soak pits/septic tanks on monthly basis. Project SPDs should ensure that the waste water collected by the vendor is disposed at the municipal sewage treatment plant and not disposed directly into any waterbody. • Construction and Demolition Waste should be stored separately, and it should be reused to the extent possible. • All waste should be stored in a shed that is protected from the elements (wind, rain, storms, etc.) and away from storm water drainage channels 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

				<ul style="list-style-type: none"> • A log book should be maintained for quantity and type of hazardous waste generated • It is to be ensured that hazardous waste is not stored for more than 90 days. Hazardous waste should be disposed through CPCB/GPCB authorized hazardous waste vendor only. • Use of spill control kits to contain and clean minor spills and leaks • Unloading and loading protocols should be prepared for diesel, oil and used oil respectively and workers trained to prevent/contain spills and leaks, and • In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste. • Vehicle and machine maintenance, if any undertaken by Project should be carried out only on paved and impervious ground. Conduct soil quality monitoring once during peak construction activity in and around the Project site in line with SAEL ESMS • EPC contractor should restore the project site and surrounding area (if used for any temporary structure) to its original condition. Project SPDs should inspect the site and ensure; the project site is properly restored prior to issuing completion certificate to the EPC contractor. 							
16.	Water Resources	Water Availability	Water during construction phase of a solar project is required mainly for civil work and domestic purpose which will be met through borewells in nearby village. Therefore, continuous implementation of the mitigation measures will help in water conservation for the project,	<ul style="list-style-type: none"> • Construction labour deputed onsite to be sensitized about water conservation and encouraged for optimal use of water; • A source vulnerability assessment is recommended to be conducted (preferably during summer season) to understand the current and future water availability in the project area • In case, project hire third party vendor for supply of water through tankers at the project sites, the project should conduct prior background check of the vendor to ensure that no illegal abstraction of groundwater and is practiced for supplying water to the project. • Regular inspection for identification of water leakages and preventing wastage of water from water supply tankers is necessary for efficient utilization of water • Blending of low quality water with fresh water for construction uses to ensure efficient use of natural resource • Recycling/reusing to the extent possible • Explore water conservation scheme e.g., rainwater harvesting at the project sites 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team	
17.	Water Environment	Water Quality	The construction activities at the project site will lead to storage of materials and hazardous and nonhazardous wastes on site which may cause leakage into the groundwater and surface water causing water contamination. Therefore, continuous implementation of the mitigation measures will help to curb water contamination during project construction	<ul style="list-style-type: none"> • Hire/engage licensed contractors for management and disposal of waste and sludge • Labourers should be given training towards proactive use of designated areas/bins for waste disposal and encouraged for use of toilets. Open defecation and random disposal of sewage should be strictly restricted • Ensure adequate number of toilet facilities are provided to the workers at construction site and labour accommodation. • Spill/ leakage clearance plan to be adopted for immediate cleaning of spills and leakages • Hazardous material should be kept on impervious layer with secondary containment • In case of accidental/unintended spillage, the contaminated soil should be immediately collected and stored as hazardous waste • Periodically monitor the ground water quality in line with SAEL ESMS • Excavated materials, scrap materials and other non-hazardous and hazardous waste should be stored away from salt marshes prior to their disposal. 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team	
Socio-economic											
18.	Labour Rights and Welfare – Project on-roll employees and contractual workers	The project will employee workforce during the construction phase. Failure to establish and foster a sound worker-manager relationship can jeopardize the Project's schedule.	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> • HR policy and management system for the Project which are satisfactory to AIIB • The project shall establish a formal policy or commitment to support the collective bargaining for all on-roll and contractual workers • Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity • The labour accommodation facility for contractual workers and as well as for regular employees should meet the requirement of the applicable reference framework, and EBRD and IFC's guidelines on workers' accommodation – in terms of space per workers, water and sanitation facilities, first aid, lighting and ventilation, etc. 	Appointed contractors, EHS&S professional, and Human resource department	Monitoring reports, and consultation with labour	Quarterly during the construction phase	Project SPVs – SAEL – EHS&S site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional/HR department, and then to SAEL – EHS&S Head	

Further, the project shall undertake regular (basis of fixed timeline) monitoring to ensure compliance through the Project lifecycle

- Project should also ensure a monthly and regular auditing mechanism for monitoring the sub-contractors and suppliers with respect to compliance with the applicable national regulations (refer to section 3 for more details on applicable national regulations on workers) and applicable reference framework of this report. The compliance shall be in terms of (but not limited to) resources, workers' working conditions, migrant workers, child labour and forced labor, GBVH (Gender-based violence and harassment), health and safety, etc.
- Project shall also establish provisions related to non-employment and abolition of any form of child labour and forced and bonded labour in the contractual agreement with Human Resource contractors. Further, the Project publicly shall showcase its commitment toward non-employment of child labour, and forced and bonded labour
- Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity
- Project shall ensure the labour rights and welfare in compliance with the ILO's eleven (11) fundamental instruments

19. Occupational Health and Safety	Health and safety hazards posed by project's construction activities that may affect workers' health and safety such as physical, chemical, electrical, and biological hazards	The workers at site during civil work will be working with construction machineries such as transit mixture, ajax mixture, driving heavy motor vehicles. Additionally, workers will be also working on cable tranche for laying underground cables, solar module installation etc, which will expose the workers to Physical, and Chemical hazards due to project activities. Therefore, continuous implementation of measures will help to reduce exposure of workers to OHS hazards and risks.	<ul style="list-style-type: none"> • All workers (regular and contracted) should be provided with training on Health and Safety policies and procedures in place with appropriate refresher courses throughout the life cycle of the Project • A site-specific training calendar should be developed and implemented onsite • Permitting system should be implemented while working in confined space as well as to ensure that cranes and lifting equipment is operated by trained and authorized persons only • Project must not remove or tamper with or cover any underground cable markers, if provided by GSECL on cable tranche • Appropriate safety harnesses and lowering/raising tools should be used for working at heights • Safe drinking water supply as per IS 10500:2012 should be provided for the workers • Adequate break or interval of at least 30 minutes after five hours of work should be provided to all the workers. • Workers should be provided awareness on drinking water in every 15 minutes while working during summers at extreme temperatures. Adequate drinking water supplies should be set up at the Project area. • Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work at the Project site. Toilet facilities should also be provided with adequate supplies of hot and cold running water, soap, etc. • An up to date first aid box should be provided at all construction sites and a qualified person should be appointed to manage it • All equipment should be turned off and checked when not in use • The site-specific occupational health and safety plan and emergency management plan should follow to account for natural disasters, accidents, and any emergency situations. • Working time should be adjusted to limit exposure to extreme heat during summer. • Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, earmuffs, and face masks should be provided to the workers. A PPE inventory should be maintained onsite • Structural integrity should be checked before undertaking any work • Electrical and maintenance work should not be carried out during poor weather • Excavated areas should be temporarily fenced to avoid access to outsiders and wildlife. • Hospital ties up with nearby hospital should be carried out • Periodic OHS audit by SAEL corporate or external party • A grievance redressal mechanism should be developed or the workers for recording their grievances 	Contractor's EHS representative	Inspection	Daily and monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
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20.	Community Health and Safety	Communicable diseases, accidents due to movement of vehicles	Development of project will lead to traffic movement on access routes and labour influx in nearby villages. Therefore, continuous implementation of the measures will help to reduce exposure of community to community health and safety hazards and risks	<ul style="list-style-type: none"> Ensuring that the sub-contractor agreements that the developer enters require all contractors to possess an EHS plan with provisions for monitoring of the EHS performance of contractors and their workers As part of the stakeholder engagement and information disclosure process, providing an understanding to the community concerning the activities proposed to be undertaken and the precautions being adopted for safety As part of stakeholder engagement, the project will also propagate health awareness amongst the community, due to influx of labour in the project area. The traffic movement for the project in the area will be regulated to ensure road and pedestrian (including livestock) safety Dedicated timings should be fixed for movement of heavy motor vehicles for transportation of construction materials at project site The traffic management plan developed as part of the ESIA should be implemented at the Project location Community health and safety plan developed as part of the ESIA should be diligently followed at the Project location The workers (both regular and contractual) on the project will be provided with trainings on the Health and Safety, and their role in the same and refresher courses will be provided throughout the life of the project Workers and community should be provided with awareness on communicable diseases. Put in place a grievance mechanism to allow for the workers and community members to report any concern or grievance related to project activities Emergency Scenarios and Response Actions should be communicated to nearby communities 	Contractor's EHS representative	Inspection	Daily and monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
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Biological Environment

21.	Site preparation and Vegetation Clearance (if required)	Habitat Modification and Loss	Provided with each measure	<ul style="list-style-type: none"> Site preparation and vegetation clearance activities should be restricted within the project site and 10 m radius of transmission towers. Vegetation for the project surrounding area should be returned to the pre-construction state, after completion of construction activities. The area for the storage yard and other supplementary facilities should be selected away from any natural habitat such as scrub land, water body, and river. Unnecessary disturbance of neighboring vegetation due to off-road vehicular movement, fuel wood procurement, and destruction of floral resources should be prohibited. There should be a ban on the use of woody plants as kitchen fuel, collected from the nearby areas (specifically from the scrub lands). Plantation of native plants in and around the project boundary (as per feasibility), on the available land should be practiced and promoted. The use of herbicides within the project site should be strictly prohibited. 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative	SAEL EHS	Monthly observation report by Project EHS
22.	Increase Anthropogenic movement	Increased Human activities, Noise and Sedimentation	Provided with each measure	<ul style="list-style-type: none"> Night-time (6:00 pm to 6:00 am) construction and transportation activities should be avoided. The areas of high animal activity, such as open scrubs and water bodies the construction and transportation activities should be avoided during dawn (6:00 am to 7:30 am) and dusk (5:00 pm to 6:30 pm). The night lamps, consist of low-glare & low UV LED lights/bulbs, should be shielded, or covered to focus the light downward. In addition to the motion sensor automated LED lights, minimizing the use of floodlights can also be effective in reducing light pollution. Hazardous materials should be avoided to store near water bodies, and salt marshes - sea water. Sites with existing burrows or roosts should be avoided where possible, and temporary fencing should be installed over excavated areas. Construction activities must implement proper housekeeping, properly dispose of discarded packaging materials, and provide labor accommodations with adequate sanitary facilities. 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative	SAEL EHS	Monthly observation report by Project EHS

				<ul style="list-style-type: none"> • Movement of workers between labour accommodations and construction sites should be restricted and they should not be allowed to visit in natural areas (specifically scrub land) not included the planned construction activities. • Frequent patrols of the project's perimeter will be conducted to deter the entry and accidental entrapment of large mammals. • During the construction phase, perch deterrents may be correctly installed on transmission towers/poles. 						
23.	Climate Change	Climate Change Vulnerability	Implementation of the mitigation measures will help to curb climate change impact on the Project	<ul style="list-style-type: none"> • High Quality Solar Modules with low degradation rate shall be installed for the project • Wind Load rating shall be checked while purchasing solar modules for the project • Strong and durable mounting system shall be installed, and panels shall be secured with proper fasteners and clamps • Ensure adequate drainage is developed in and around the plant to avoid water logging during construction and operation phases • Avoid use of Ozone Depleting Substances during construction phase 	Contractor's EHS representative	EHS Inspection	Six monthly	Project EHS representative	SAEL EHS	Six monthly observation report by Project EHS team
Operation Phase										
Physical Environment										
24.	Noise Quality	Impacts on receptors due to noise during operation phase	Operation of a solar power plant does not have significant noise impacts. However, continuous implementation of the mitigation measures will help to curb the limited noise impacts.	<ul style="list-style-type: none"> • Vehicle drivers should be instructed not to blow horns until necessary • Anti-honking sign boards to be placed at entry / exit points of the project • Vehicles should be maintained regularly to avoid noise from engines etc 	Contractor's EHS representative	Visual Observation and EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
25.	Soil Environment	Soil Contamination	The operation activities at the project site will lead to generation, storage and handling of hazardous and nonhazardous wastes on site which may cause leakage into the soil causing soil contamination. Therefore, continuous implementation of the mitigation measures will help to curb soil contamination during project operation.	<ul style="list-style-type: none"> • Municipal domestic waste generated at site to be segregated onsite • An authorized third party vendor should be engaged to collect municipal solid waste from the site on daily basis. Alternatively, Project SPD should appoint a vendor for collection of solid waste on daily basis from the solar plant site. • Ensure hazardous waste containers are properly labelled and stored onsite provided with impervious surface, shed and secondary containment system • Ensure routinely disposal of hazardous waste through approved vendors and records are properly documented • Discarded solar panels, laptops, monitors at SCADA room should be stored in a designated area within the Project site and disposed in line with E-waste management rules, 2022. • Oil/ lubricants will be stored on impervious floor in the storage area having secondary containment • Use of spill control kits to contain and clean minor spills and leaks during O&M activities • The guidelines and procedures shall be prepared and followed for immediate clean-up actions following any spillages • The sewage generated onsite should be treated and disposed in septic tanks and soak pits • A dedicated schedule should be developed for cleaning of the soak pits and septic tanks by third party vendor. • Transportation vehicles and equipment should undergo periodic maintenance at local workshops in Bhuj city to avoid any oil leakage • Any unloading and loading protocol should be prepared for diese, oil and used oil respectively and workers trained to prevent spills and leaks 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team
26.	Water Resource	Water Availability	Water requirement during operation phase of a solar power project is mainly due to solar module cleaning and domestic purpose. The water requirement during operation phase will be met through third party vendors. Therefore, continuous implementation of mitigation measures may potentially mitigate impact on water resources due to the project.	<ul style="list-style-type: none"> • Optimizing water usage in the SCADA building and site office by application of water conservation measures such as sensor-based taps, low flush urinals etc. • Project SPD should identify alternative source of water such as village ponds or ground water from nearby villages to receive water for its operation • Records of daily water consumption to be maintained • Regular inspection for identification of water leakages and preventing wastage of water 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

				<ul style="list-style-type: none"> Recycling/reusing to the extent possible Feasibility of constructing rainwater harvesting system at site should be checked 						
27.	Water Environment	Water Quality	The operation activities at the project site will lead to generation of wastewater on site which may cause leakage into the groundwater and surface water causing water contamination. Therefore, continuous implementation of the mitigation measures will help to curb water contamination during project operation.	<ul style="list-style-type: none"> The provisions of septic tank and soak pits should be provided onsite for disposal of sewage, thereby minimizing the impacts of wastewater discharge. Project SPD should develop a cleaning schedule of soak pits/septic tanks. It should identify an authorized vendor for cleaning of the soak pits/septic tanks on monthly basis per the cleaning schedule. Project SPD should ensure that the wastewater collected by the vendor is disposed at the municipal sewage treatment plant and not disposed directly into any waterbody. Project should ensure that adequate drainage line in and around the site to avoid impact on natural drainage channels due to discharge of wastewater from solar module cleaning within site. Planning of toilets, soak pits and septic tanks, waste collection areas should be away from salt marshes 	Contractor's EHS representative	EHS Inspection	Monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

Socio-Economic

28.	Labour Rights and Welfare – employees and contractual workers	The project will employee workforce during the construction phase. Failure to establish and foster a sound worker-manager relationship can jeopardize the Project's schedule.	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature.	<ul style="list-style-type: none"> HR policy and management system for the Project which are satisfactory to AIB The project shall establish a formal policy or commitment to support the collective bargaining for all on-roll and contractual workers Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity The labour accommodation facility for contractual workers and as well as for regular employees should meet the requirement of the applicable reference framework, and EBRD and IFC's guidelines on workers' accommodation – in terms of space per workers, water and sanitation facilities, first aid, lighting and ventilation, etc. Further, the project shall undertake regular (basis of fixed timeline) monitoring to ensure compliance through the Project lifecycle Project should also ensure a monthly and regular auditing mechanism for monitoring the sub-contractors and suppliers with respect to compliance with the applicable national regulations (refer to section 3 for more details on applicable national regulations on workers) and applicable reference framework of this report. The compliance shall be in terms of (but not limited to) resources, workers' working conditions, migrant workers, child labour and forced labor, GBVH (Gender-based violence and harassment), health and safety, etc. Project shall also establish provisions related to non-employment and abolition of any form of child labour and forced and bonder labour in the contractual agreement with Human Resource contractors. Further, the Project publicly shall showcase its commitment toward non-employment of child labour, and forced and bonded labour Establish workers engagement plan and grievance redressal mechanism – to showcase the engagement mode and model of the project with workers and to allows the workers to report any concern or grievance related to work activity <p>Project shall ensure the labour rights and welfare in compliance with the ILO's eleven (11) fundamental instruments</p>	Appointed contractors, EHS&S professional, Human resource department	Monitoring reports, and consultation with labour	Half yearly during operation phase	Project SPVs – site manager	SAEL – EHS&S Head	Reporting from contractors to EHS&S professional/HR department, and then to SAEL – EHS&S Head
29.	Occupational health and Safety	Health and safety hazards posed by project's O&M activities that may affect workers' health and safety such as physical and electrical hazards	The workers at site during O&M will undertake routine inspection of solar PVs, cables, transformers etc, which will expose the workers to Physical, and Chemical hazards due to project activities. Therefore, continuous implementation of measures will help to reduce exposure of workers to OHS hazards and risks	<ul style="list-style-type: none"> All workers (regular and contracted) should be provided with training on Health and Safety policies and procedures with appropriate refresher courses throughout the life cycle of the Project A site-specific training calendar should be developed and implemented onsite Hospital tie up with nearby hospital should be done Adequate fire safety system including fire extinguishers, sand buckets should be provided on site Safe drinking water supply should be provided for the workers Adequate break or interval of at least 30 minutes after five hours of work should be provided to all the workers. 	Contractor's EHS representative	EHS Inspection	Daily and monthly	Project EHS representative of Project SPVs	SAEL Project management team at the corporate level	Report from onsite EHS team to corporate EHS team

- Workers should be provided awareness on drinking water in every 15 minutes while working during summers at extreme temperatures. Adequate drinking water supplies should be set up at the Project area.
- Adequate lavatory facilities (toilets and washing areas) should be provided for the number of people expected to work at the Project site. Toilet facilities should also be provided with adequate supplies of hot and cold running water, soap, etc
- An up to date first aid box should be provided at site and a qualified person should be appointed to manage it
- The site-specific occupational health and safety plan and emergency management plan should be implemented at the project location
- Personal Protective Equipment (PPEs) including safety shoes, helmet, goggles, ear muffs and face masks should be provided to the workers. A PPE inventory should be maintained onsite
- Structural integrity should be checked before undertaking any work
- Electrical and maintenance work should not be carried out during poor weather
- Annual health checkup of workers should be undertaken

Biological Environment

30.	Power Transmission	Collision and Electrocutation	Provided with each measure	<ul style="list-style-type: none"> • Cross arms transmission poles, suspended insulators, and insulated jump connectors should be utilized. • Bird perch rejecters should be applied on transmission towers/poles. • Frequent checking of the transmission towers/poles to avoid bird nesting. • Disposal of carcasses near project components (solar plants and transmission line) should be restricted, and carcasses observed around project components should be immediately removed to avoid attracting vultures and raptors. • A perennial water body (15.013191°, 78.136266°) is located about 1.5 km from the substation in south; the section of transmission line passing close to it (in 0.5 to 1.0 km range), should be equipped with bird fly diverters. • A Bird Carcass Register should be maintained to record the bird mortality (with the name of the species, number, reason of death and date of report) observed and/or reported along the transmission line. In case of observation and/or report of ecologically significant species (IUCN threatened, Migratory, restricted range species) carcass, Ecology and Biodiversity expert should be consulted to avoid and/or reduce such mortalities. 	Contractor's EHS Manager	Visual Inspection and Record Keeping	Trimonthly	Site EHS	SAEL EHS	Trimonthly Report from site EHS to Corporate EHS
31.	Access of Wildlife to the Project Compound	Human-Wildlife Conflicts	Provided with each measure	<ul style="list-style-type: none"> • Maintain the wall height 6 to 8 feet throughout. • Use of metallic nets on the wall holes for rainwater to avoid entrance of large herpetofauna and mammals. • Regular checking of the boundary wall to avoid any space for larger wildlife entrance into compound. • Good housekeeping practices in the project compound could help to reduce the faunal attraction. • Prohibit the use of floodlights in unnecessary areas and minimize their usage in required locations. • Training on wildlife encounter situations and the do's and don'ts of dealing with these situations should be delivered to all the project officials, workers and supervisors. 	Contractor's EHS Manager	Visual Inspection and Record Keeping	Trimonthly	Site EHS	SAEL EHS	Trimonthly Report from site EHS to Corporate EHS

Climate Change

32.	Climate Change Vulnerability		Continuous implementation of the mitigation measures will help to curb climate change impact on the Project	<ul style="list-style-type: none"> • Arrange partnership for accurate weather observation and solutions with real-time alerts to enable dynamic, just-in-time operations • Ensure there is a dedicated, forward-looking budget for mitigating weather-related risks • Continue to monitor the evolving scientific understanding of climate change hazards and reassess climate change induced risks to specific project elements at regular intervals (e.g., every five years) in the future 	-	-	Trimonthly	O&M Team of Project SPVs	SAEL EHS	Report from site EHS to Corporate EHS
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- Durability and stability of the mounted solar panels shall be checked periodically

Cumulative Impacts

33.	Cumulative Impacts	The recommended mitigation measures shall not impact any technical aspect of the project. The implementation of required mitigation measures is continuous in nature	<ul style="list-style-type: none"> • Project shall attempt to establish a cumulative impact working group with other solar project developers to address environmental and social cumulative risks. • Project shall share its current and future monitoring data on physical environment, biodiversity and socio-economic baseline and impacts with other developers • Project shall share information on its current/planned biodiversity and socio-economic mitigation with other developers, in an attempt to foster good practice • 	Project EHS Incharge	Record Keeping	Trimonthly	Site EHS	SAEL EHS	Trimonthly Report from site EHS to Corporate EHS
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Draft Report

8 Impact Summary and Conclusion

8.1 Introduction

This Environmental and Social Impact Assessment (ESIA) has been conducted to evaluate the impact associated with the Project. The impact assessment has been conducted in compliance with the requirement of administrative framework (refer to Section 3).

8.2 Significance of Impacts

The ESIA has focussed on interaction between the Project activities and various resources/receptors that could result in significant impacts. The table provided below presents the outcome of the comprehensive assessment of identified impacts as a result of the various phases of the project.

Table 8-1 Impact Assessment Summary

Impact Description	Impact Duration	Phase of the Project	Significance of Impact	
			Without Mitigation	With Mitigation
Physical Environment				
Land use	Permanent	Construction Phase	Small	Negligible
Topography and Drainage	Permanent	Construction Phase	Substantial	Small
Air Quality	Long	Construction Phase	Small	Negligible
Noise Quality	Medium	Construction Phase	Small	Negligible
	Long	Operation Phase	Small to Negligible	Negligible
Soil Erosion and Compaction	Long	Construction Phase	Small	Negligible
Soil Contamination	Long	Construction Phase	Substantial	Negligible
	Short	Operation Phase	Small	Negligible
Water Availability	Long	Construction Phase	Major	Small
	Permanent	Operation Phase	Substantial	Small
Water Contamination	Long	Construction Phase	Substantial	Negligible
	Long	Operation Phase	Small	Negligible
Social				
Leasing private land	Short	Construction	Substantial	Small
Installation of TL Towers and Stringing	Short		Small	Negligible
Impact Due to influx of Migrant workers	Short duration	Construction and Operation Phase	Moderate	Minor
Stress on Local Resources	Short duration	Construction and Operation Phase	Moderate	Negligible
Labour Rights and Welfare	Short duration	Construction and Operation Phase	Major	Minor
Contractor and Supplier Management	Short duration	Construction and Operation Phase	Major	Minor
Gender-based violation and harassment	Short duration	Construction and Operation Phase	Moderate	Negligible
Occupational Health and Safety	Long	Construction Phase	Substantial	Small
	Long	Construction Phase	Substantial	Small
Community Health and Safety	Long	Operation Phase	Substantial	Small

"The report is intended solely for the information and internal use of SAEL Industries Limited ("SAEL") and is not intended to be and should not be used by any other person or entity. No other person or entity is entitled to rely, in any manner, or for any purposes, on this report".

Impact Description	Impact Duration	Phase of the Project	Significance of Impact	
			Without Mitigation	With Mitigation
Biological Environment				
Habitat Modification and Loss	Permanent	Construction Phase	Substantial	Small
Impacts on the Habitat and Species due to Construction Activities	Short duration	Construction Phase	Substantial	Small
Collision and Electrocutation Risk due to Power Transmission, etc.	High	Negative	Major	Substantial
Human-Wildlife Conflicts	Permanent	Operation Phase	Substantial	Small
Cumulative Impact				
Cumulative Impact	Permanent	Construction and operation phases	Major	Major

8.3 Project Categorization

The categorization as defined by AIIB’s AIIB Environmental and Social Framework (2024) based on the magnitude of associated risks and impacts is defined below.

a) Environment – A, B, C, FI

Category A.

A proposed project is likely to have significant adverse environmental impacts that are irreversible, diverse, or unprecedented. These impacts may affect an area larger than the sites or facilities subject to physical works. An environmental impact assessment (EIA), including an environmental management plan (EMP), is required.

Category B.

The proposed project’s potential adverse environmental impacts are site-specific, few if any of them are irreversible, and in most cases mitigation measures can be designed more readily than for category A projects. An initial environmental examination (IEE), including an EMP, is required.

Category C.

A proposed project is likely to have minimal or no adverse environmental impacts. An EIA or IEE is not required, although environmental implications need to be reviewed.

b) Involuntary Resettlement (IR) – A, B, C, FI

Category A.

A proposed project is likely to have significant involuntary resettlement impacts. A resettlement plan, which includes assessment of social impacts, is required.

Category B.

A proposed project includes involuntary resettlement impacts that are not deemed significant. A resettlement plan, which includes assessment of social impacts, is required.

Category C.

A proposed project has no involuntary resettlement impacts. No further action is required.

In accordance with AIIB’s AIIB Environmental and Social Framework (2024), the categorization of the proposed Project been presented as below.

Aspects	Categorization
a) Environment – A, B, C, FI	<p>Category B.</p> <ul style="list-style-type: none"> Construction activities on site may have medium scale impacts which includes land use change, air emissions, water availability, wastewater generation, solid waste including hazardous waste generated, noise and traffic related impacts. Construction activities will also have impacts on occupational health

Aspects**Categorization**

and safety and community health & safety. The impacts will be largely reversible and can be readily addressed through mitigation measures suggested in the ESMP.

- Operation and maintenance activities may have impact related to waste generation, water availability, occupational health and safety within the project. The identified impacts can be minimized and/or avoided by implementing adequate mitigation measures suggested in ESMP.
- The construction and operational activities of the proposed activities will adversely impact the surrounding ecology. Most of these impact(s) can be minimized through application of mitigation measures to be suggested in the ESIA report.

b) Involuntary Resettlement (IR) –
A, B, C, F

Category B

PS-5 requires project proponents to anticipate and avoid, or where avoidance is not possible, minimize adverse social and economic impacts from land acquisition or restrictions on land use. The key themes covered under this are: compensation and benefits for displaced persons, consultation and grievance mechanism, resettlement planning and implementation, physical displacement, economic displacement. The PS-5 also prescribes private sector responsibility to supplement government actions and bridge the gap between governments assigned entitlements and procedures and the requirements of PS-5.

Based on the consultation with SAEL, it is understood that about 1881.32 acres of Dry Agriculture private land from Koduru Village have been identified, out of which ~1500 acres from 350 landowners will be procured for the proposed project. The land is proposed to be sourced by executing long term lease agreement on Willing Lessor and Willing Lessee basis. As on date of site visit, Agreement to Lease (ATL) and Lease agreements were signed for about 1205.985 acres of. Based on the findings made during the ESIA and sample consultation made with the landowners establishes the land identified for the project does not hold any physical residential structures and the land was classified as Dry Agriculture land, the agriculture is not being extensively cultivated due to scarcity of the irrigation facilities.

It was also confirmed by the SAEL land team that.

- The solar plant site does not source land by way of expropriation or other compulsory procedures in accordance with the legal system of India.
- The land required for the project are being source through negotiation with the farmers and the compensation to be paid is in accordance with the AP Renewable Energy Export Policy 2020 and its amendments.
- The project activities will not restrict access to the neighboring landowners, cattle grazers, farmers and not restrict access to the communal property and natural resources such as marine and aquatic resources, timber and non-timber forest products, freshwater, medicinal plants, hunting and gathering grounds and grazing and cropping areas.
- The project will not deviate the natural streams / irrigation canals which serves as source of irrigation and livelihood for the neighboring farmers.
- There has been no implementation of site specific development of Stakeholder Engagement Plan and Grievance Redressal Mechanism for engagement with local community members.

Regarding transmission line, the safeguard applies due to the following reasons:

- As the construction of transmission line (especially tower) will obstruct the usage of the resource (agricultural land) to the Project Impacted Households (PAHs) and will also result in loss of standing crops. The impact duration will be for short period of time and may remain for six (6) months (the one agriculture season takes 3 to 4 months).
- The stringing of transmission line will not result in obstruction of resource (agriculture land). However, the stringing will result in loss of standing crops.

APPENDIX 1: DOCUMENTS REVIEWED

Sr. Documents Reviewed

No.

-
1. Project Location in KMZ

 2. Project Schedule

 3. Power Purchase Agreement

 4. Land Lease Agreement

 5. Detailed Project Report

 6. Organization Chart

 7. Project Land Acquisition Process

 8. Land Summary

 9. Equipment Details

 10. Information Request List

 11. Forced Labour Undertaking and Attestation

APPENDIX 2: PROJECT SCHEDULE**Phase 1: Planning and Design - 600 MW SECI -AP - 757 days**

S.No	Task Description	Start Date	End Date	Duration
1.	Preliminary Activities and Site Mobilization	7/28/2023	7/31/2024	370 days
2.	LOA	7/28/2023	7/28/2023	1 day
3.	PPA	12/30/2023	12/30/2023	1 day
4.	Grid Connectivity Approval & submission of BG	1/1/2024	3/15/2024	75 days
5.	Land handover with ESG Clearance	6/1/2024	6/7/2024	7 days
6.	Land Possession & handover	6/8/2024	7/31/2024	54 days
7.	Mobilization, Survey, Approvals	5/9/2024	7/14/2024	67 days
8.	Team Mobilization	5/9/2024	5/31/2024	23 days
9.	Transmission Line & Route Survey	5/19/2024	6/2/2024	15 days
10.	Soil Testing & Topography Survey, Hydrology	6/8/2024	7/7/2024	30 days
11.	Pre Construction Approvals (Labour Licence, BOCW, EAR, WC Policy, Intimation to State pollution control board etc)	6/15/2024	7/14/2024	30 days
12.	Engineering	3/6/2024	10/8/2024	217 days
13.	Basic Design & Approvals	3/6/2024	6/3/2024	90 days
14.	Detailed Design & Approvals	4/25/2024	8/11/2024	109 days
15.	Non Land Dependent Design	4/25/2024	7/8/2024	75 days
16.	Land Dependent Design	6/18/2024	8/11/2024	55 days
17.	Release of Construction Drawings	8/1/2024	10/8/2024	69 days
18.	Engineering Closure	10/8/2024	10/8/2024	1 day
19.	Procurement & Delivery	4/20/2024	4/26/2025	372 days
20.	Ordering	4/20/2024	10/5/2024	169 days
21.	Fencing	6/8/2024	6/17/2024	10 days
22.	MMS & Tracker	6/14/2024	7/28/2024	45 days
23.	Module	6/26/2024	7/30/2024	35 days
24.	Central Inverter	4/20/2024	5/9/2024	20 days
25.	Power transformer	5/5/2024	5/29/2024	25 days

26.	Inverter Duty Transformer	4/25/2024	5/15/2024	21 days
27.	HT Panel and Electrical equipments	6/19/2024	7/18/2024	30 days
28.	LT,DC and HT Cables	6/23/2024	7/27/2024	35 days
29.	String Combiner Box	6/29/2024	7/28/2024	30 days
30.	Solar Cables	8/1/2024	9/4/2024	35 days
31.	Earthing Material	7/13/2024	8/16/2024	35 days
32.	Misc Material	6/17/2024	9/14/2024	90 days
33.	Sub-Contractor Finalization	6/8/2024	10/5/2024	120 days
34.	All material Ordering Finish	10/6/2024	10/6/2024	1 day
35.	MFC, PDI, Delivery	7/3/2024	4/26/2025	298 days
36.	Fencing material	7/3/2024	8/31/2024	60 days
37.	MMS Column	9/22/2024	12/5/2024	75 days
38.	Tracker & MMS Top Parts	11/16/2024	3/15/2025	120 days
39.	Solar Cable	11/4/2024	2/11/2025	100 days
40.	DC & HT Cables	9/26/2024	12/24/2024	90 days
41.	String Combiner Box	11/26/2024	2/23/2025	90 days
42.	Module Delivery	12/28/2024	4/26/2025	120 days
43.	Central Inverter	11/6/2024	2/23/2025	110 days
44.	Inverter duty Transformer	11/12/2024	2/19/2025	100 days
45.	Power Transformer	1/10/2025	2/3/2025	25 days
46.	HT Panel and Electrical equipments	1/10/2025	2/28/2025	50 days
47.	Earthing Material	10/16/2024	1/13/2025	90 days
48.	Misc Material Delivery	10/15/2024	3/28/2025	165 days

Phase 2: Construction & Installation - 331 days

S.No	Task Description	Start Date	End Date	Duration
1.	Site Office setup	7/7/2024	8/5/2024	30 days
2.	Land Bushing and Leveling	7/17/2024	9/14/2024	60 days

3.	Fencing Work	7/5/2024	11/1/2024	120 days
4.	Module Structure Foundation (Piling)	9/24/2024	2/20/2025	150 days
5.	AC/ DC Cable trench Work	11/8/2024	4/1/2025	145 days
6.	Civil Foundation For SCB stand & installation	12/1/2024	3/30/2025	120 days
7.	Construction for ICR	9/5/2024	2/1/2025	150 days
8.	Foundation for Main HT Panel	11/15/2024	3/14/2025	120 days
9.	Construction	10/25/2024	3/23/2025	150 days
10.	Inverter Duty Transformer Foundations	9/5/2024	2/1/2025	150 days
11.	Construction of Switchyard (Civil Work)	8/1/2024	12/28/2024	150 days
12.	Transmission Line Tower Foundation	8/21/2024	1/7/2025	140 days
13.	MMS & Tracker Installation	11/21/2024	4/4/2025	135 days
14.	AC Cabling Laying	1/14/2025	3/24/2025	70 days
15.	Solar Cable and DC Cable Laying	11/28/2024	5/16/2025	170 days
16.	Solar Panel/PV Module	1/7/2025	5/16/2025	130 days
17.	String Combiner Box	12/31/2024	4/19/2025	110 days
18.	Modules Interconnections	2/6/2025	5/21/2025	105 days
19.	Inverter and other ICR Instruments	2/7/2025	4/27/2025	80 days
20.	HT Panel and other electrical panel	3/5/2025	4/23/2025	50 days
21.	Installation of Inverter Duty Transformer	1/13/2025	4/12/2025	90 days
22.	Cable Terminations (AC circuits)	3/10/2025	4/28/2025	50 days
23.	Cable Terminations (DC circuits)	2/27/2025	5/27/2025	90 days
24.	Switchyard equipments erection & Readiness	11/29/2024	4/22/2025	145 days
25.	Transmission Line Tower Erection & Stringing	11/19/2024	4/27/2025	160 days

26.	Balance Work	5/22/2025	5/31/2025	10 days
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Phase 3: Approvals and Commissioning - 133 days

S.No	Task Description	Start Date	End Date	Duration
1.	Pre commissioning & Equipment testing	4/12/2025	5/26/2025	45 days
2.	CEIG of Transmission Line	5/18/2025	6/11/2025	25 days
3.	CEIG of Switchyard and Solar Plant (300 MW)	5/27/2025	6/10/2025	15 days
4.	Charging Approvals (300 MW)	6/12/2025	6/18/2025	7 days
5.	Commissioning of the plant (300 MW)	6/19/2025	6/23/2025	5 days
6.	Trail Run, Plant Stabilization, Punch Point Closure, Handing Over to SAEL O&M	6/24/2025	8/22/2025	60 days

APPENDIX 3: PHOTOLOG

Some representatives of the floral diversity



Acacia nilotica (L.) Delile



Ficus benghalensis L.



Azadirachta indica A.Juss.



Cassia fistula L.



Prosopis juliflora (Sw.) DC.



Prosopis cineraria (L.) Druce



Albizia lebbek (L.) Benth.



Peltophorum pterocarpum (DC.) K. Heyne



Pongamia pinnata (L.) Pierre



Hardwickia binata Roxb.



Parkinsonia aculeata L.



Lantana camara L.



Borassus flabellifer L.



Cocos nucifera L.



Phoenix sylvestris (L.) Roxb.



Euphorbia antiquorum L.



Euphorbia caducifolia Haines



Opuntia stricta (Haw.) Haw.



Calotropis gigantea (L.) Dryand.



Carissa carandas L.



Grewia asiatica L.



Senna auriculata (L.) Roxb.



Solanum pubescens Willd.



Tephrosia purpurea (L.) Pers.



Croton bonplandianus Baill.



Tribulus terrestris L.



Passiflora foetida L.



Glinus oppositifolius (L.) Aug.DC.



Ipomoea carnea Jacq.



Typha domingensis Pers.

Some representatives of the faunal diversity



Oriental Garden Lizard



Common Palm Squirrel



Bonnet Macaque



Black-winged Kite



Indian Peafowl



Brahminy Starling



Red-wattled Lapwing



White-browed Wagtail



Little Ringed Plover



River Tern



Lesser Whistling-duck



Indian Spot-billed Duck



Common Coot



Little Grebe



Long-tailed Shrike



Pied Kingfisher



White-breasted Kingfisher



Asian Green Bee-eater



Indian Cormorant



Great Cormorant



Oriental Darter



Cattle Egret



Little Egret



Purple Heron



Grey Heron



Painted Stork



Asian Openbill



Eurasian Spoonbill



Black-headed Ibis



Red-naped Ibis



Solar Plant Site



Solar Plant Site



Consultation with Stakeholders



Consultation with Stakeholders



Access road to site



Access road to site



Consultation with Landowners

APPENDIX 4: GRIEVANCE REDRESSAL MECHANISM

1. Grievance Redressal Mechanism

Grievance redressal is another critical component of effective stakeholder engagement. The purpose of GRM is to provide a framework to the internal and external stakeholders to voice their complaints, concerns, queries, and issues with the project. Such a mechanism provides the stakeholders with one channel of communication through which their complaints and queries can be raised, and timely response can be ensured. This allows for trust building amongst the stakeholders and prevents the accumulation of multitude of small issues into major community unrest. The GRM is aimed at being accessible and understandable to all stakeholders in the project and for the entire project life. The GRM will also be applicable for any contractor appointed during the construction and operations phases of the Project.

This contains the following:

- Objectives of GRM
- Grievance definition and categories, and GRM principles
- The process of receiving, documenting, addressing, and closing grievances.

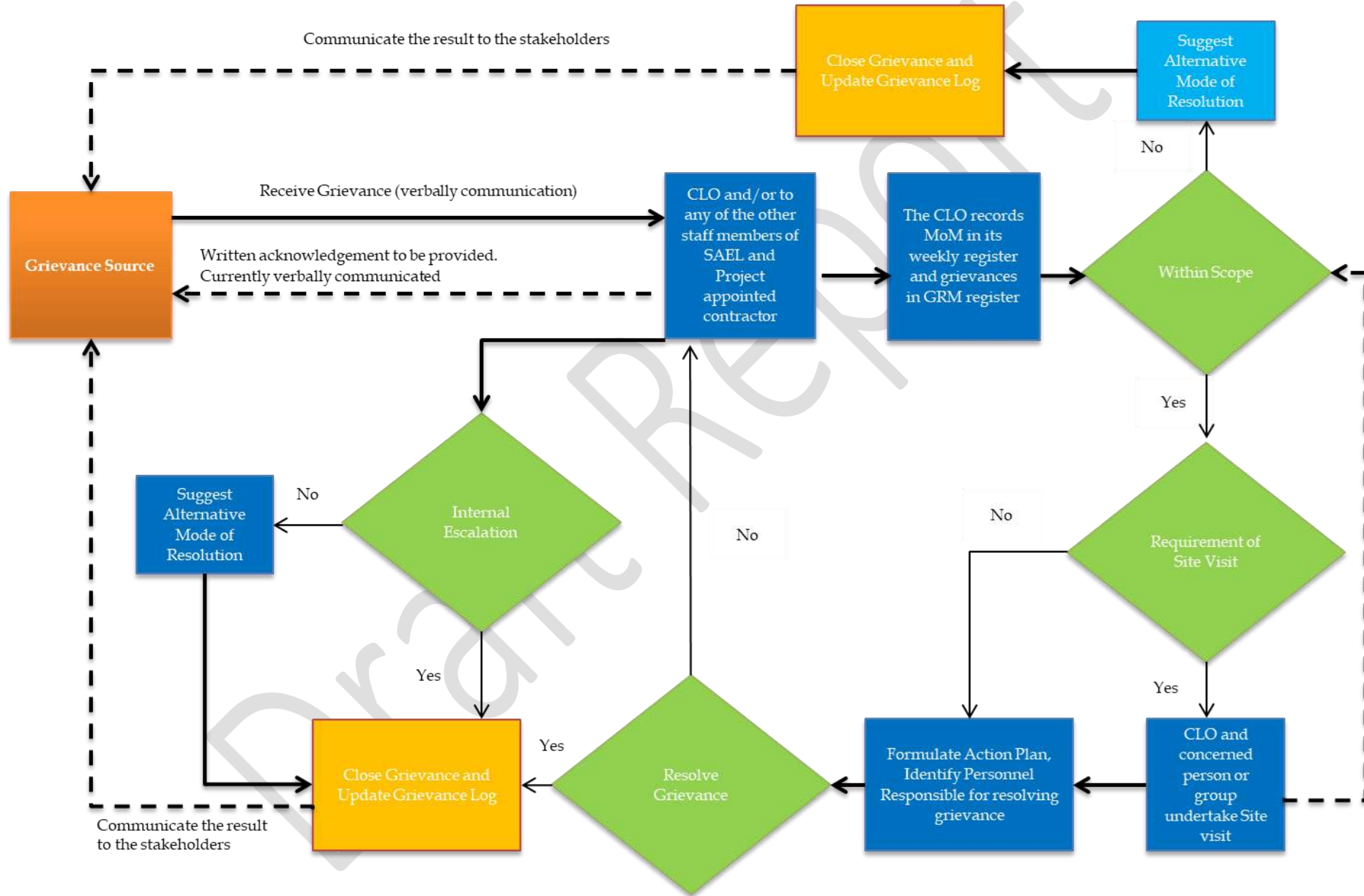
1.1. Objective of Grievance Redressal Mechanism

- To provide stakeholders with a clear process for providing comment and raising grievances
- To allow stakeholders the opportunity to raise comments/complaints through using the grievance redressal committee established
- To structure and manage the handling of comments, responses, and grievance are handled in a fair and transparent manner, in line with SAEL's internal policies, and international best practices.

1.2. Grievance Redressal Mechanism

The process to be followed for the redressal of the stakeholder raised grievances is summarized below: The bold lines represent the grievance escalated from stakeholder to concern staffs and then from concern staff to further escalated. The dotted lines are the representation of communicating back of resolution to the stakeholder.

Figure: External Stakeholder Grievance Redressal Mechanism Schematic Representation



1.2.1.Publication and Disclosure of the GRM

The GRM will be disclosed to the stakeholders through written, and verbal communication. The medium to use for this purpose are public meetings, group discussions, and display of GRM provisions in Gram Panchayat officers, and other key locations. The GRM shall be disclosed in the local language (in this case Hindi) and as well as in English. As part of the public meetings going forward, the project will provide a refresher of the provisions of the GRM, and the way grievances can be communicated.

1.2.2.Receiving and Recording Grievances

A complaint can be submitted to SAEL through the following methods:

- During regular meeting held between stakeholders and the project team
- By submitting verbal complaint to the land team and other project team
- For written communication of complaints,

In the construction phase, the project will consider establishing the process of written communication to be administered by the Engineering and Procurement Contractor (EPC) and maintained at the site office. The daily grievance log register will be recorded by the project specific team.

1.2.3.Maintaining a Grievance Register

A grievance register will be created and maintain at the project site by the Community Liaison Officer (CLO). Details of the stakeholder(s) communicating the issue/complaint are noted along with the summary of the grievance. Depending upon the nature of the grievance, the option of legal redressal can be taken if requires.

The grievance register will regularly be updated at each stage of the grievance redressal. Once the grievance is recorded in the register, a preliminary analysis will be undertaken by the concerned staff to ensure that the grievance is within the scope of the GRM. The grievance will be registered by CLO.

1.2.4 Acknowledgement of Grievance

The Project will establish a timeline of communication such that – once the grievance is received and recorded, the stakeholder will be provided with an acknowledgement of the receipt within seven (7) working days, along with a summary of the grievance.

1.2.5 Providing Initial Response

The stakeholder that lodged the initial comment is then contacted within seven (7) working days to acknowledge that the Project site team will log the grievance and provide feedback in the written format. A copy of this notification is submitted to the stakeholder. The notification contains details of the next steps to be taken for investigation.

1.2.6 Investigation and Resolution

Depending upon the sensitivity of the grievance, and nature of the complaint, a site inspection may be required, but not in all cases. The purpose of the site inspection is to check the validity and severity of the grievance. For this purpose, the personnel may also undertake discussions with the concerned external stakeholder. The inspection is undertaken within fifteen (15) working days of receiving the grievance. After site inspection, the assigned individual then works with other relevant members of the Project team to investigate the problem, communicate an update to the concerned complainant, and identify measures to resolve the grievance as appropriate.

The update on the grievance is communicated to the aggrieved person, on a weekly basis or at frequency suitable for the nature of the case by the Project team.

1.2.7 Resolution, Escalation and Closure

CLO, in consultation with the concerned staff will identify a suitable resolution to the issue. This resolution is accordingly communicated to the aggrieved stakeholder within seven (7) working days of completing the investigation.

1.2.8 Update of Records

The records of the grievance register are updated every working week with the present status of the grievance. Once the grievance is resolved, and the same has been communicated to the complainant, the grievance is closed in the grievance register. The grievance register also provides an understanding of the manner in which the grievance was resolved. These instances shall then serve as references for any future grievances of similar nature. However, the project will ensure that all grievances communicated will be maintained in a confidential manner.

SAMPLE GRIEVANCE RECORDING REGISTER

Sr. No	Date	Village/ Location	Topic of grievance	Summary of grievance	Stakeholder Group	Acknowledgement date	First response date	Follow-up (if applicable)	Unique Grievance ID	Status

GRIEVANCE REGISTRATION FORM

GRIEVANCE REGISTRATION		
Grievance No.:	Date:	
Name:	Father's/Spouse's Name:	
Village:	Taluka:	
Phone no.		
Category of grievance:		
Summary		
Name of person recording grievances:		
Designation of recording person:		
Proposed date of response to grievance:		
Signature of recording person	Signature of complainant	

ACKNOWLEDGEMENT RECEIPT		
This receipt is acknowledgement of grievance registration by _____ _____, resident of village _____ on date _____. His case number is _____ and the date for response is _____.		
Name of the person recording grievances:		
Designation of the recording person:		
GRIEVANCE REDRESSAL RESPONSE		
Date of redresses:		
Decision of CLO (give full details):		
Claimant accepts the outcome:	Accepted	Not accepted
Signature of claimant:		
Signature of CLO:		
Note:		
Please note, if at any time the grievant is unsatisfied with the resolution of the grievance, they may choose to ask for an escalation to the next level or may resort to legal redress.		

APPENDIX 5: LIVELIHOOD RESTORATION FRAMEWORK (LRF)

1 Introduction

SAEL Industries Limited (hereafter referred to as 'SAEL' or the 'Client'), is currently engaged in the development of a 300 MW solar power project (hereinafter referred to as 'the Project'). The Project entails the design, development, construction, operation, and maintenance of 300 MW AC solar photovoltaic power plant located in YSR (Kadapa) and Anantapur Districts, Andhra Pradesh, India (the Project).

In this regard, SAEL has engaged Environment & Social Advisors (E&S Advisors) to develop Livelihood Restoration Framework (LRF) as part of Environmental and Social Impact Assessment (ESIA) of the Project against the objectives, principles, and requirements of AIIB's Environment and Social Framework and other applicable environmental and social requirements as per Applicable Reference Framework (ARF). This LRF is drawn in accordance with the following acts, rules and policies, and generally accepted practices and principles of resettlement and rehabilitation. This LRF will act as guide for mitigating the social impacts that would be triggered by the schemes under the project.

This document will be regularly updated, as a result of consultations with stakeholders, as described in the Stakeholder Engagement Plan. The LRF will set the livelihood restoration process which should be implemented and developed as part of the Livelihood Restoration Plan (LRP).

1.1 Need for Livelihood Restoration Framework

Since the land procurement for the project and transmission line route finalization is yet to be completed and thus the overall impacts on land requirements and potential involuntary resettlement cannot be determined upfront. The project activities may have an impact on restrict of access to the neighboring landowners, cattle grazers, farmers, which can only be ascertained during the preparation of the Livelihood Restoration Plan (LRP). Hence, the preparation of a Livelihood Restoration Framework (LRF) is needed, to describe the principles, objectives and processes for preparation of specific resettlement plans that will be applicable to interventions financed by the AIIB project. The LRF describes the principles and approach in avoiding, minimizing and mitigating adverse social impacts that may arise in implementation of proposed interventions financed by the AIIB. The LRF also provides process for consultations, impact assessment, census and socio-economic surveys, as well as for the preparation and implementation of mitigation plans. The LRF was prepared in line with the provisions of National laws, State laws and the AIIB's ESP. The LRF will be reviewed and updated from time to time to ensure relevance and consistency with applicable all applicable laws and with AIIBs policies.

1.2 Objective of the LRF

The objective of the LRF is to document the plans and requirements that shall be adopted to restore the livelihood of the Project Affected Households (PAHs) impacted due to construction of the project site and transmission line and establish the basis for the avoidance and management of impacts with the transmission line which has yet to be defined. The livelihood shall be restored at the pre-project level in accordance with the applicable reference framework. The LRF serves to document avoidance and/or minimization measures of any adverse involuntary economic displacement. The LRF also puts forward principles and commitments regarding entitlements and compensation, and mitigation measures for impacts that cannot be avoided.

1.3 Basic Principles of the Policy Framework

The basic principles on the basis of which the RPF has been developed are:

- **Avoidance:** wherever possible, involuntary acquisition of land should be avoided

- **Least disturbance:** where involuntary acquisition is not avoidable, efforts will be made to minimize displacement, damage to / loss of property, loss of livelihood and any other negative social impact the project may have. Only the minimum amount of land required for a project is to be secured
- **Public purpose:** the land acquired must be found to serve a legitimate and bonafide public purpose and the social benefits should outweigh and potential social costs
- **Participative:** the process of land acquisition should be done through a humane, participative, informed and transparent process in which local self-government and Gram Sabhas are consulted and interested parties are fully informed and have a chance to air their grievances
- **Fair compensation:** The affected families will receive fair compensation for any loss of land along with a compensation award for resettlement
- **Maintaining the social and economic status of families:** the framework is based on the principle that there should be minimal possible negative impacts on the livelihoods of the affected families. Where resettlement is unavoidable, the resettlement plan should attempt to ensure that affected families are able to maintain the same social and economic status as they did before displacement. Affected families will be provided appropriate compensation and where possible jobs in the project.

2 Project Description

M/s SAEL Solar MHP1 Pvt. Ltd (SSMPL) is a privately held company engaged in power generation. It operates as a subsidiary of SAEL Industries Limited (SIL), which is promoted by SAEL Limited (SAEL). SSMPL has embarked on the development of a 300 MW Solar Power Project in Koduru village, Kondapuram tehsil, YSR District and Bodaipalle village, Tadipatri tehsil, Anantapur District in Andhra Pradesh. SAEL land team has identified approximately 1881.32 acres of land for the Solar plant site, out of which ~1500 acres will be procured for the project site, and it will be acquired through lease for the entire duration of the Power Purchase Agreement (PPA) which is executed between M/s SAEL Solar MHP1 Private Limited and the Solar Energy Corporation of India Limited. M/s SAEL Solar MHP1 Pvt. Ltd was awarded the project through a reverse bidding process based on tariff considerations.

The salient features of the project are presented in Table below:

Salient Features of the 300 MW Solar Power Plant

Sr. No.	Components	300 MW Solar Power Plant
General Details		
30.	SPV Name	M/s SAEL SOLAR MHP1 PVT. LTD) (Hereinafter referred to as "Project SPVs)
31.	Project Capacity	300 MW
32.	Site coordinates	15.030029°N, 78.139211°E
33.	Site Location	The project site encompasses two distinct villages located in Andhra Pradesh, India, namely, <ol style="list-style-type: none"> 3. Koduru in Kondapuram Mandal, YSR District, and 4. Bodaipalle in Tadipatri Mandal, Anantapur District.

Sr. No.	Components	300 MW Solar Power Plant
34.	Nearest Highway	State Highway NH 544F around ~4 km towards south direction.
35.	Nearest Railway Station	Tadipatri railway station located at an aerial distance of ~6 km from the project boundary towards Southwest direction.
36.	Nearest Airport	Cuddapah (CDP) Airport located at an aerial distance of 82 km from project boundary towards West-Southwest direction.
37.	Current Project Status	<p>The project is currently under Pre-construction stage where land lease agreement and power purchase agreement has been executed between the SAEL Solar MHP1 Private Limited and SECI respectively.</p> <p>Power Purchase Agreement has been executed between SAEL Solar MHP1 Private Limited and Solar Energy Corporation of India Limited for the purchase of power from 300 MW solar power plant dated 5 January 2024.</p>
38.	Commercial Operation Date	Tentatively December 2025
Project Component		
39.	Total PV Modules	605775(tentative) for 300 MW solar project
40.	Module Make	SAEL 630Wp Topcon
41.	Solar Technology	Photovoltaic (PV) System
42.	Mounting type	Horizontal Single Axis Tracker
43.	Module Cleaning Type	Dry cleaning, supplemented by wet cleaning (65% -70% dry cleaning and 30%-35% wet cleaning)
44.	Total Inverters	91
45.	Inverter Make	Inverter Make-Sineng 3.3MW (Central Inv.)
46.	Transformers	2Nos of 150/180 MVA
Power Transmission Details		
47.	Transmission Line type	Not available

Sr. No.	Components	300 MW Solar Power Plant
48.	Transmission Line length	The project will install the transmission line of length ~12 km (since the pooling substation location is not yet confirmed and hence the transmission line length is tentative) between the pooling substation and the grid substation of 220KV Kurnool-III ISTS.
49.	Pooling Substation	Pooling substation will be constructed within Project boundary.
50.	Grid Substation	400 kV grid substation of Kurnool-III ISTS (15°03'00.29°N, 78°13'92.11°E) located at an aerial distance of ~12 km from the Project site towards the north direction.
51.	Power Purchase Agreement	The Power Purchase Agreement was signed between SAEL and SECI on 5 January 2024.

Additional Project Infrastructure

52.	Additional Project Infrastructure	It is expected that separate storeroom, site office, scrap yard will be set up within the respective project boundary.
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Project Land Details

53.	Land Requirement for the project	SAEL land team has identified approximately 1881.32 acres of land for the Solar plant site, out of which ~1500 acres will be procured for the project.
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E&S Sensitivities

54.	Presence of Indigenous People	<p>The project area does not fall within the Schedule V areas as designated by the Ministry of Tribal Affairs, Government of India. Additionally, based on review of census records revealed that there are no Scheduled Tribe population in the project Village Koduru. The land identified for the project are Dry Agriculture land has remained unaffected by any form of human settlement, encroachment, grazing, or other human activities.</p> <p>Furthermore, the implementation of the project will not result in the loss of collective attachment to distinct habitats or ancestral territories by any communities or groups of Indigenous Peoples.</p>
55.	Presence of common property usage or culturally sensitive areas within 5 km radius of the project	As confirmed during the site visit, there are no structures, common property resources, water bodies, structures bearing cultural importance were observed within the proposed solar plant site and SAEL had reported to avoid such cultural important places while considering the Transmission Line route. Based on the review of secondary data from Archaeological Survey of India (ASI) ⁵⁸ and Google earth pro no cultural heritage falls inside the study area of 5 km radius. The nearest ASI Notified

⁵⁸ <https://asi.nic.in/>

Sr. No.	Components	300 MW Solar Power Plant
		sites are located at the distance of ~8 km (Rameswara Swamy Temple, and Chintalarayasvami Temple Tadipatri)

Source: Site visit, Google Earth Imagery dated 30.10.2022 and data shared by Client

2.1 Project Location and Site setting

The solar project site will be developed in an area covering two villages namely (i) Koduru village, Kondapuram tehsil, YSR District, and (ii) Bodaipalle village, Tadipatri tehsil, Anantapur District in the state of Andhra Pradesh for a capacity of 300 MW solar project. The proposed project will be situated at an elevation ranging between 242 m to 255 m above mean sea level on flat to undulating agricultural land. The designated area for the project primarily covered with agricultural crops and trees, predominantly Neem, Tamarind and Acacia. Currently, sorghum and chickpea is being cultivated in the designated land parcels, characterized by a soil composition consisting mainly of a blend of sand and black soil within the region.

While the proposed project is spread across two villages, Koduru and Bodaipalle, the nearest settlements are located at (i) Konduru village located at ~55m from the boundary towards south direction, (ii) Murugampalli village located at ~40m from the boundary towards northeast direction, (iii) Bodaipalle village located at ~350m from the boundary towards southwest direction and (iv) K. Sirigepalle village located at ~550m from the boundary towards north direction. Additionally, a school (ZP High School) is also located at a distance of ~84 m from the site towards south direction. Also, there is a temple, at the arial distance of ~150 m in the south direction of the project boundary. As per the discussion with the land and project team, access to the school or temple will not be blocked, and the project fencing will be done accordingly.

During E&S Advisors site visit, approximately 100-120 trees (predominantly Neem, Tamarind and Acacia) were observed within the project boundary and as confirmed by SAEL, most of them will not be removed as they are close to the boundary. However, the tree-cutting permission will be acquired from the forest department after the completion of land procurement..

Murugampalli T – Koduru Road is also observed to be passing adjacent to the identified land parcels for the project. As per the discussion with the land team, it was reported that fencing for the project will be done, without disturbing the existing road. Few dirt road or tracks are also observed passing through the project, used by the nearby community.

The nallah was also observed within the project site running from west to east ultimately connecting the Penna River which is located at an aerial distance of ~1.8 km towards south direction of the project boundary. During E&S Advisors site visit, it was observed that the nallah as well as the Penna River stream appeared to be dried up. A small seasonal-water pond was also observed within the project area which as reported collects the rainwater, reportedly, not used for any applications.

The proposed project is accessible via the Murugampalli-T. Koduru road which gets connected to State Highway at a distance of ~2.5 km towards south direction. No separate approach road is proposed to be developed and existing village road will be used during both construction and operation phases of the project.

The project location map has been presented in the Figure Below.

3.1.1 Summary of Applicable Regulations and Safeguards

Regulation and/or safeguards	Description	Relevance/Applicability on the Project
Andhra Pradesh Renewable Energy Export Policy, 2020	Followed by the Policy being notified by the Government, NREDCAP had submitted proposal for revision in the policy. As per the amendment issued by the Government dated 13-09-2022, the compensation issued to the landowners was revised from INR. 25,000 to INR. 30,000 with 5% escalation every two years. Under this amendment, the remittance charges which to be deposited in the consolidated fund of the state has been revised from INR. 6000 to INR. 1000 with 5% escalation for every two years.	These Acts and Guidelines are relevant for the determination of the compensation to be paid for the land impacted at the Project site
The Electricity Act and Indian Telegraph Act, 1885	The Electricity Act and Telegraph Act define the compensation payable for damages to crops/ trees and structures along the transmission line route	These Acts and Guidelines are relevant for the determination of the compensation to be paid for the land impacted by the tower footprint or falling under the RoW for the transmission line for the project
MoP Guidelines for Payment of Compensation Towards Damages in regard to RoW, 2015	Guidelines for payment of compensation towards damages in regard to Right of Way for transmission lines. The guidelines have proposed compensation to be paid for the base area in between the transmission tower (between four legs) and towards diminution of land value in the width of the RoW corridor due to laying of transmission line @ 85 % and 15 % respectively of the land value as determined by the District Magistrate or any authority based on circle rate/ guideline value/ stamp value/ stamp act.	

The national laws with regards to land acquisition only covers rights of the legal landowners, and therefore, the law does not fully provide for the rights of unofficial land users in accordance with the requirements of AIIB ESS 2.

3.1.2 AIIB's ENVIRONMENTAL AND SOCIAL POLICY

The AIIB Environmental and Social Policy applies to the Project funded by it (AIIB) and sets out the general processes and requirements for project screening and categorization, environmental and social due diligence, environmental and social assessment, environmental and social management plans, environmental and social assessment tools and management plan framework, information disclosure, public consultation, monitoring and reporting as well as grievance redress. It also defines the roles and responsibilities between the Bank and the clients. The Policy must be complied with to secure AIIB financing for the development projects.

3.1.3 AIIB'S INVOLUNTARY RESETTLEMENT, ESS 2

In line with the Social Standard 2 of the AIIB ESF 2021, Involuntary Resettlement Standard aims to avoid involuntary resettlement wherever possible; to minimize Involuntary Resettlement by exploring Project alternatives, where avoidance is not feasible, to enhance or at least restore the livelihoods of displaced persons in real terms relative to the pre-project levels, to improve the overall socio-economic status of the displaced poor and other vulnerable groups, and to conceive and implement resettlement activities as sustainable development programmes, providing sufficient resources to enable the persons displaced by the project to share in project benefits.

3.2 Review of key Indian Regulations

This section provides a detail on the key Indian regulations related to the Land Acquisition.

3.2.1 Andhra Pradesh Renewable Energy Export Policy, 2020

Andhra Pradesh Government in order to encourage, develop and promote renewable energy projects in Andhra Pradesh had notified “Andhra Pradesh Renewable Energy Export Policy 2020”. The objective of the policy would be.

- To facilitate 120 GW renewable energy projects.
- To facilitate lease of 5 lakh acres of potential land in the state of Andhra Pradesh to renewable energy export project developers.
- To attract private investments to the State and improve local economy.
- To promote setting up of renewable energy equipment manufacturing facilities in the State.
- To generate additional revenue to the State Government.

The policy facilitates the developer in land facilitation by appointing NREDCAP as a land aggregating agency. NREDCAP will procure and aggregate government and private lands at potential locations for allotment to the project developers on lease basis. Land lease facilitation will be done by Nodal Agency to the permitted developers against payment of prescribed charges with lease period of 30 years. Under this policy the government encourages the private developers to install connecting transmission line or using the existing / new evacuation line developed by APTRANSCO, by bearing the entire cost for laying those lines.

Followed by the Policy being notified by the Government, NREDCAP had submitted proposal for revision in the policy. As per the amendment issued by the Government dated 13-09-2022, the compensation issued to the landowners was revised from INR. 25,000 to INR. 30,000 with 5% escalation every two years. Under this amendment, the remittance charges which to be deposited in the consolidated fund of the state has been revised from INR. 6000 to INR. 1000 with 5% escalation for every two years.

3.2.2 Transmission Line Right of Way Regulations

3.2.2.1 Section 10 and 16 of the India Telegraph Act, 1885

Section 10

Power for telegraph authority to place and maintain telegraph lines and posts. The telegraph authority may, from time to time, place and maintain a telegraph line under, over, along, or across, and posts in or upon, any immovable property subject to the following conditions:

- The telegraph authority shall not exercise the power conferred by this section except for the purpose of a telegraph established or maintained by the Central government of India
- The central government shall not acquire any right other than that for use of the property for placing telegraph lines passing either under, over, along or across the property
- The central authority shall not exercise its powers with respect to any property which is under the control or management of any local authority without permission of that authority
- Given the powers under this section, the telegraph authority shall minimize/avoid damage to the property to the extent possible and shall pay full compensation to all persons interested in any damage sustained by them due to the powers exercised by the telegraph property with respect to the land

Section 16

Section 16 of the Act is applicable, in continuation to Section 10, and is triggered when disputes arise on the land parcel upon which the telegraph authority will exercise its powers. The disputes relate to either compensation or claim of ownership of the land parcel, which is not under the ownership of the state/local government authority. The provisions of this section are as follows:

- In situations where the powers of the telegraph authority on the land parcel (as acquired under Section 10) is contested/resisted, the District J (DM) of the concerned district where the land parcel is situated, can issue permissions to the telegraph authority to exercise its powers
- Disputes that might arise regarding the compensation amount (as decided under Section 10), will be settled by the District Judge, upon application regarding the insufficiency of the compensation value made by the concerned parties having ownership on that parcel
- Disputes that might arise regarding the parties claiming ownership on the property upon which the telegraph authority will exercise its powers, will be settled by the District Judge after hearing claims from all parties asserting a claim in the compensation amount. If there are multiple ownerships, the compensation shall be decided in proportions in which the persons are entitled to it. The telegraph authority, on its part, will deposit the entire compensation amount, as decided to the District court
- If any person resists the powers of the telegraph authority even after the permission is granted by the DM, the person shall be convicted under Section 188 of the IPC for criminal offence.
- In the case of Telegraph Authority, there is no question of obtaining any consent from the landowner unlike in case of non-Telegraph authority governed by the provisions of 67 of the 2003 Act and Section 12 to 18 of Indian Electricity Act, 1910

3.2.2.2 Section 67 and 68 of the Electricity Act, 2003

Section 67

Section 67 of the Electricity Act 2003 (along with Section 68 discussed below) deal with the powers of the central/state authority on the use of land for Right of Way (RoW), erection of transmission towers/electric poles. However, the provisions of Electricity Act under Section 67 apply on the licensee (as appointed by the government) who has not been granted the powers of the Telegraph Authority under the Telegraph Act, 1885.

The licensee, subject to the terms and conditions of the license, as awarded by the government, may carry out work to lay down supply lines, that includes:

- To open/break the soil and pavement of any street, railway
- To open/break any sewer, drain or tunnel in or under any street, railway
- To lay down and place electric lines, electrical plant and other works
- To repair existing electrical supply lines

In order to carry out works, as incidental to, and required for the laying of electrical supply lines, the appropriate government (central/state), may specify the conditions and grant the necessary permissions, particularly on matters relating to –

- Consent of the local authority, owner or occupier of the land parcel on which work is to be carried out, as required
- The duration of the contract of the licensee, and the nature of work
- Determining the compensation amount, procedure of deposit of compensation amount payable by the licensee and payment process to the persons affected by the work to be carried out
- The rights of the owner/occupier of the land parcels that is being utilized for the works to be carried out by the licensee
- The procedure for fencing, guarding, and other safety measures relating to work on streets, railways and for alteration of the position of pipes, electric lines, telegraph lines
- The manner of restoration of property affected by such works and maintenance of the same
- Matters relating to disputes on compensation amount shall be determined by an “appropriate commission”.

The execution of works, involving erection of towers and connection of overhead lines, are done, only after a detailed field study, by identifying a feasible route of the proposed transmission line and by selecting a suitable corridors, by avoiding densely populated residential areas, span length, the angle of deviation, the extent of

damage, likely to be caused, while erecting towers, maintenance cost of electric lines and towers and more particularly, the public interest in providing electricity to a large section of people and industrial establishments.

Section 68

The section provides for process of approval from the appropriate government for stringing of overhead lines, and/or maintenance of existing overhead lines. While section 67 contains provisions granted to the licensee by the government regarding erection of towers, this section deals with structures under the transmission line (TL) RoW

- Any tree, or any structure standing near overhead line, or has been placed near an overhead line after the approval of the RoW, and erection of towers, can be removed or dealt with as accordingly by the licensee, after obtaining necessary approvals from appropriate government.
- In case of any tree, structure in existence prior to the approval of the RoW and subsequent construction activities in the RoW, compensation shall be awarded to such persons with ownership of the trees/structures by the licensee. (Tree includes shrub, jungle, hedge).

Section 68 of the Act contemplates that the appropriate government may, by rules made in this behalf, delegate the powers for carrying out over headline tower works and such power cannot be delegated by anyone else especially without prior permission from the appropriate government. Section 68 (2) (c) of the Indian Electricity Act prescribe the period of notice to be given prior to carrying out the works

Section 164

This section grants the equivalent powers as vested to the telegraph authority through the Telegraph Act of 1885 to the private licensee (electricity generation and Distribution Company) for placing/erecting TL towers, and procurement of easement rights for RoW (Ministry of Power, Procedure for Obtaining Authorization U/s 164 of the Electricity Act, 2003, 2016). The appropriate government may elevate the status of a private company to the status of a public body and confer the powers as prescribed in the Telegraph Act upon the licensee, upon the submission of request from the company. In the submission of request, the licensee will furnish the following details:

- Newspaper publication of the scheme (dissemination of information in public domain)
- Authenticated maps showing the details of the selected route alignment, along with justification

Review of the Acts

- In exercise of the powers under Section 10 of the Telegraph Act, the telegraph authority shall commit trespass on any private property, subject to the condition that while doing so, they are under an obligation to ensure that minimal damages is caused meaning thereby a power is vested with the telegraph authority to commit trespass subject to certain conditions
- Following section 16 of the Telegraph Act is counterintuitive to Section 10 of the Act. The provision of the former allows for objection/prior approval of all land parcel owners whose land parcels have been identified for erection and stringing activity in the RoW. It is argued that Section 16 renders Section 10 of the Telegraph Act, and Section 164 of the Electricity Act 2003 without any actual value (K. Varadharajan vs The Chairman, Tamil Nadu Electricity Board, 2014)
- Section 10 of the Telegraph Act confers powers on the Telegraph authority to trespass, and therefore, dismisses the requirement of obtaining prior consent from land parcel owners for construction activities. Section 16 of the Act describes the process of entertaining objections, and due process of compensation. The same powers can be obtained by a private licensee, by submission of request under Section 164 of the Electricity Act. In that case, provisions of Section 67 of the 2003 Act are invalid and do not apply. The licensee is then governed by the provisions of Section 68 and Section 164 of the Electricity Act 2003 (Maharashtra State Electricity Commission vs Shri Vikram Sunderdas Setiya, 2011)

- Section 164 of the Electricity Act, 2003 together with Section 10 of the Telegraph Act, 1885 provides absolute power to the licensee to proceed with placing of electric supply lines or electric polls for the transmission of electricity on or over the private lands. Neither the acquisition of land is necessary nor there need any for consent of owner or occupier. This is subject to the rights of the owners on claims to compensation for loss of trees/structures (including crops) only, and not for loss of land, since land is not being acquired (Shivnarayan Mahajan vs Power Grid Corporation Of India, 2016)

3.2.2.3 Guidelines on Payment of Compensation for the Right of Way (RoW) for Transmission Lines, Ministry of Power, October 2015

In order to address the inadequacy of rules and statutes contained in Section 16 of the Telegraph Act and Section 68 of the Electricity Act regarding payment of compensation for loss of trees/structures, the Ministry of Power formulated guidelines for determining the compensation towards "damages" as stipulated in the Electricity Act, 2003 along with Indian Telegraph Act, 1885. These guidelines take into account losses that were not described in the two Acts. The guidelines are applicable for construction activities related to electricity lines of 66 kV and above (Ministry of Power, 2015). These are:

- For tower base area impacted by erection activities, compensation at 85% of land value based on Circle rate/Stamp Act rates for tower base area.
- For deterioration in value of land caused due to stringing of overhead lines and demarcation of the RoW corridor, compensation will be decided by the States as per the land category s.t a maximum of 15% of the land value based on Circle rate.

It is important to note that the Central Guidelines defined the type of impacts, which was lacking in the earlier Acts. The Guideline defines two types of impacts as evident from the compensation guidelines stated above:

- Tower base area which is lost due to severe restriction of access
- Corridor of land underneath the RoW between towers that can be affected by restrictions on its use
- The above is over and above the damage compensation to be provided during construction

Brief Comparison

Theme	Telegraph Act, 1885	Electricity Act, 2003	Ministry of Power Guidelines, 2015
Prior consent	Section 10 allows for trespassing on private land, and therefore no consent is taken	Section 164 of the Act replicates the powers of the Telegraph Act for the private licensee	Does not specify consent process/objection process of landowners/occupiers
Compensation for loss of trees/structures	Section 16 of the Act allows for objections from owners/occupiers;	Compensation for loss of trees/structures	Compensation principles determined for loss of land under tower erection
Compensation for loss of access to land	The Act argues that since no land is acquired, there is no compensation to be paid for land	Same as in the Telegraph Act	Loss in land value due to restrictions on land use under RoW width. These compensations will be over and above the compensation for loss of trees/crops/structures

3.2 AIIB Environmental and Social Framework 2024

The Asian Infrastructure Investment Bank (AIIB) has developed an Environmental and Social Framework (ESF) to ensure that its investments support sustainable development. The overarching objective of this policy is to facilitate achievement by the Bank's Clients of these development outcomes, through a system that integrates sound environmental and social management into Projects.

Environmental and Social Policy (ESP) outlines the institution's commitment to ensuring that its projects promote environmentally sustainable and socially inclusive development. The policy sets forth mandatory environmental and social requirements applicable to all Projects. 2024 ESF includes revised Environmental and Social Standards (ESS) that reflect the latest global best practices in managing risks and impacts.

Environmental and Social Standards (ESS) provide more detailed requirements for project implementation. These standards are designed to help borrowers and clients meet the ESP's objectives. The following three associated environmental and social standards (ESSs), which set out more detailed mandatory environmental and social requirements to be implemented by the Client, depending on the nature of the Project. These standards cover the following:

- **ESS 1 Environmental and Social Assessment and Management:** ESS1 applies to the project if the bank determines based on consultation with the client, that the Project is likely to have adverse environmental and/or social risks and impacts, it requires the Client to conduct an environmental and social assessment relating to these risks and impacts, and design appropriate measures to avoid, minimize, mitigate, offset or compensate for them, all as required under ESS 1. The 2024 updates to ESS 1 reflect AIIB's dedication to aligning with global best practices and addressing the growing challenges of climate change, biodiversity loss, and social inequality.
- **ESS 2 Land Acquisition and Involuntary Resettlement:** ESS2 applies to the projects likely to involve Involuntary Resettlement and bank recommends addressing these aspects in the social section of the assessment report. The objectives of this ESS 2 are: (a) to avoid Involuntary Resettlement wherever feasible; (b) to minimize Involuntary Resettlement by exploring Project alternatives; (c) where avoidance of Involuntary Resettlement is not feasible, to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-Project levels and to provide resettlement assistance; (d) to understand and address gender-related risks and differential impacts of Involuntary Resettlement; (e) to improve the overall socioeconomic status of the displaced poor and other vulnerable groups; and (f) to conceive and implement resettlement activities as sustainable development programs, providing sufficient resources to enable the persons displaced by the Project to share in Project benefits.
- **ESS 3 Indigenous Peoples:** ESS 3 applies if Indigenous Peoples are present in, or have a collective attachment to, the proposed area of the Project, and are likely to be affected by the Project. The objective of the ESS 3 are to design and implement Projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, economies and cultures, as defined by the Indigenous Peoples themselves, so that they: (a) receive culturally appropriate social and economic benefits; (b) do not suffer adverse impacts as a result of Projects; and (c) can participate actively in Projects that affect them.
- **Disclosure of Environmental and Social Information:** AIIB emphasizes transparency and accountability through the disclosure of environmental and social information related to its projects. Disclosure may be timely, accessible, gender sensitive and inclusive and culturally appropriate manner and location, and in a form and language(s) understandable to the Project-affected people, other relevant stakeholders who may have specific needs. The objective is to provide these stakeholders with an opportunity to broadly identify and address the Project's environmental and social risks and impacts, including those involving Involuntary Resettlement, Indigenous Peoples and community health and safety aspects, so they can provide meaningful inputs into the design and implementation of the Project.

Cut of Date

The impacts due to the construction work at Project site and the transmission line are anticipated to be temporary in nature. The compensation for any impact shall be paid as per entitlement matrix. Regarding

the transmission line, a prior notice is served after the detailed/check survey, finalization of tower location prior to the construction activity to the land owners (irrespective of gender the notice shall be served to the landowners – female and male). The notice shall provide information that the proposed transmission line through the property of the individual. The notice shall contain the particulars of the land, ownership details and the details of the crops and trees, and any form of structure inevitable to be damaged during the course of the construction of the proposed transmission line. This serves as a record for identifying the actual PAHs and the date of issuance of this notice can be treated as cut-off-date for identification and assessment of damages.

4 Objective and Scope of Work for Preparation of Livelihood Restoration Plan (LRP)

4.1 Background

The prime objective of this framework is to provide a comprehensive plan for creating a Livelihood Restoration Plan (LRP) for the people affected due to land procurement for the project site and the transmission line. Therefore, the scope of this Livelihood Restoration Plan (LRP) is prepared to ascertain that the project affected persons whose livelihood was directly and indirectly impacted due to the procurement of land by the project or transmission line. The scope of this proposal is specifically tailored to align with the finalized project boundary and transmission line configurations overseen by SAEL India Limited within the state of Andhra Pradesh. The LRP will provide a measures to address the impacts arising out of temporary economic displacement caused by land acquisition and/or restriction of access to identified project-affected people and mitigate social impacts. The LRP will focus primarily on the restoration of means of livelihood to pre-project levels for the persons temporarily affected by the project or transmission line. This LRP will consider a worst-case approach to assess the number of persons who are likely to be affected by the project or transmission line in respect of livelihoods and will be prepared based on the Primary data collection based on social impact assessment, Census and Asset Survey and proper identification of all affected households and entities.

The LRP which will be developed will define the implementation approach and steps required to mitigate the livelihood impacts caused by economic displacement in respect of the identified PAPs on account of land procurement for the project site and the transmission line. Following are the broad objectives of the LRP:

- Provide measures that will be applied to mitigate the adverse livelihoods impacts.
- Provide measures for ongoing engagement with the beneficiaries of the LRP.
- Detail the approach followed to arrive at the eligibility for availing LRP measures, the consultation process for firming up and rolling out the measures.
- Provide a precise account of impacts on account of the land acquisition including physical and economic displacement and livelihoods impacts.
- Outline stakeholder consultation process, institutional arrangements such as GRM, and disclosure arrangements on an ongoing basis.
- Provide guidance on LRP implementation including timelines, monitoring indicators.

4.2 Scope of Work for the Livelihood Restoration Plan (LRP):

The detailed scope of work encompasses:

1. Provide a brief overview of projects, their objectives, and the context of LRP. Summarize relevant details such as project location, scale, and potential impacts on Project Affected Household (PAH)

2. The Client is required to provide the list of voluntary and involuntary displacements (if any) caused due to the project. The LRP will focus on ensuring data collection, impact assessment, meaningful consultation, compensation calculation and payment, etc. will be undertaken as required.
3. Review to understand that the land acquisition process has been done through meaningful and well-documented consultation with titled and untitled landowners.
4. Understand impacts associated with the development of the project site and TL, including land acquisition for tower footings, assets damaged during stringing and construction, and restricted land use associated with the TL ROW, will be treated as involuntary resettlement impacts due to the project's ability to resort to legal mechanisms to ensure access to required land.
5. Understand the impacts of land acquisition and/or lease on households will be determined, and that adequate attention will be paid to household socio-economic baseline data collection, gender concerns, including specific measures addressing the need of female-headed households, vulnerable Households, commercial enterprises, gender-inclusive consultation, information disclosure, and grievance mechanisms.
6. The consultant will undertake tasks and develop data commensurate to the risks and impacts of the Project on affected parties. The Consultant will develop the LRP in a manner consistent with the guidelines of AIIB ESS2.
7. Development of tools for collecting relevant data, including primary census surveys for 100% of Project Affected Households, interviews, and focus group discussions. Detail how the collected data will be analyzed to inform the impact assessment
8. Specify the approach for assessing payment of compensation to meet full replacement cost for lost along with developing specific and measurable livelihood restoration measures.
9. Consider short-term and long-term interventions, ensuring they align with the needs and preferences of affected PAH
10. Ensure coherence and consistency between the LRP and other project plans
11. Provide a detailed timeline for the implementation of the LRP
12. Include key milestones, activities, and deadline
13. Clearly define the roles and responsibilities of all parties involved in the implementation, including project proponents, and implementing agencies
14. Provide a detailed budget for the implementation of the LRP
15. Develop a robust framework for monitoring and implementation of the LRP.

4.3 Approach and Methodology for Preparation of Livelihood Restoration Plan (LRP)

Developing a Livelihood Restoration Plan (LRP) will be in accordance with the AIIB ESS 2 involves a structured approach and methodology.

4.3.1 Approach for the LRP

- Understanding Applicable Standards: Thoroughly with AIIB ESS Policy, specifically focusing on the sections related to involuntary resettlement and livelihood restoration.

- Stakeholder Engagement: Identify and engage with relevant stakeholders, including affected PAHs, local government authorities, non-governmental organizations (NGOs), and other key actors. Facilitate inclusive consultations to understand the concerns and aspirations of affected communities.
 - Legal and Regulatory Compliance: Analyze the requirement of national laws and regulations related to land acquisition, resettlement, and livelihood restoration. Align the LRP with national and state legislations along with AIB policies and guidelines
 - Baseline Assessment: Conduct a comprehensive baseline assessment of the affected area, considering social and economic aspects. Evaluate existing livelihoods, assets, and socio-economic activities in the project area.
 - Impact Assessment: Assess the potential impacts of the project on the livelihoods of affected communities. Identify and quantify the nature and extent of impacts on income, employment, assets, and access to resources.
 - Alternatives Analysis: Explore and evaluate alternatives to avoid or minimize adverse impacts on livelihoods. Consider project design modifications or alternative locations to reduce negative effects.
- Livelihood Restoration Strategy: Develop a comprehensive strategy for livelihood restoration based on the impact assessment in discussion with the relevant stakeholders. Prioritize measures to restore or improve affected communities' livelihoods, considering both short-term and long-term interventions.

4.3.2 Methodology for LRP



Based on the initial findings of the existing Resettlement and Livelihood Restoration Plan, the following approach will be taken up by the E&S Advisors team to update the LRP as described below:

Task 1: Document Request and Review

E&S Advisors will undertake a review of documentation to support the updated LRP in order to align with the Regulatory Framework. For efficiency, E&S Advisors will request the available land owner details based on 7/12 identification, KML file/maps/analysis of alternatives of the transmission line and any other documents available at this stage. The deliverables associated with this activity include the development of the first three chapters of the LRP: Introduction, Project Description, and Regulatory Framework.

Task 2: Socio-Economic Baseline and Census Survey

E&S Advisors will prepare a set of survey tools to undertake the census and socio-economic survey. It is mandatory that 100% of the identified Project Affected People (PAPs) are included in the census and socio-economic survey. The census and socio-economic survey provide quantitative demographic data on households /asset owners and relationships within the household as well as data on asset ownership, livelihoods, and vulnerability. Livelihoods will consider ecosystem services and other natural resources. It also provides a more in-depth understanding of livelihoods, education, health, household strategies food security, etc. Another important output of the census and

socio-economic assessment will be a list of indicators to be used for monitoring the implementation of the LRP. Therefore, questionnaires will also be designed to ensure the data can inform the development of key performance indicators for future monitoring and evaluation. Our local partner, Associated Consultants will capture data electronically using Tablets (which will have a server) and tablets and data will be analysed using Excel. Lead Associated Consultants personnel will work on site and supervise the teams. Due to the quick turn-around required, additional supervisors will be on site to minimise the risk of problems with data collection. The number of PAPs / households affected by either physical and / or economic displacement is not yet known, however we will proceed in discussion with the Clients and lenders.

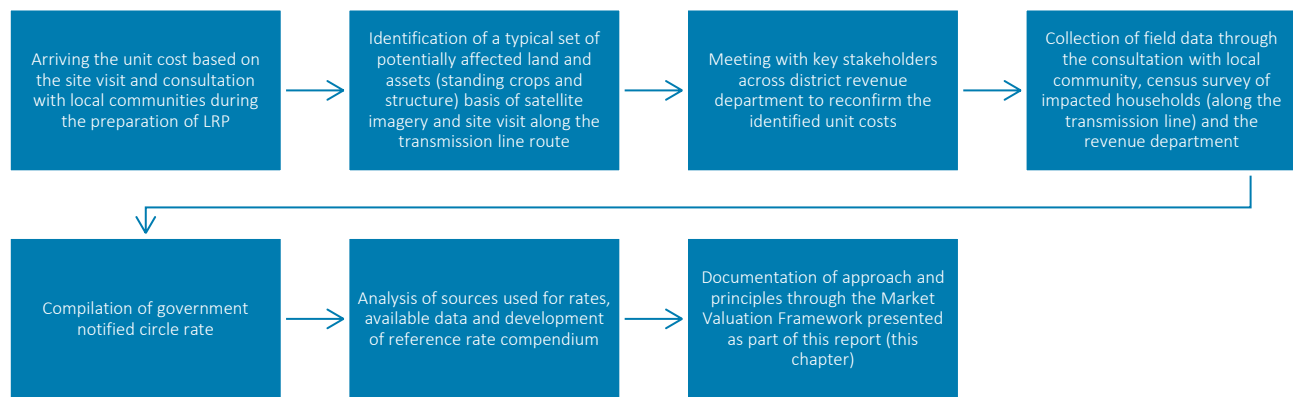
Task 3: Training of Surveyors

We will spend one day planning / training session with survey team, valuers and enumerators on techniques for data collection, use of tablets, field planning and health and safety as well as a session for piloting the household questionnaires and survey tools.

Task 4: Market Valuation Framework

This LRF has been developed prior to the initiation of land procurement (obtaining the easement rights) and construction of the transmission line. It is expected that the project will align the principles and strategies proposed in this document to the overall approach it puts into place to procure easement rights for the transmission line under the Electricity Act, 2003 and Indian Telegraph Act, 1885 and in line with AIIB's ESP requirements. The following illustrative approach summarizes key tasks/activities put in place to develop market valuation principles that are outlined in this section:

Activities to develop the market valuation framework



Replacement Cost for land valuation

The registration and stamps department of Andhra Pradesh publishes ready reckoner rates based on data and information that is gathered by each District revenue department. These ready reckoner rates are to be effective from April of that financial year. Ready reckoner rates are published for each revenue village for land and consider the following factors:

- Classification of the land type in government records
- Whether irrigated or unirrigated, in use or not in use
- Productivity of the land, distance from the road, elevation of the land parcels, irrigation system/facilities available for the land parcel

- Commercial and/or industrial purpose trends

Based on a review of the Draft Good Practices Handbook: Land Acquisition and Resettlement (IFC,2019), the use of the comparative method can be considered for the LRP in view of a functional real estate market along the transmission line. This method requires a review of available government rates, analogue transactions and the rates referred by banks for collaterals along with applicable transaction costs. Further, based on the comparison of all the above-mentioned rates, the highest rate of the land among all the rates shall be finalized for the compensation.

Agriculture purpose structure

The value of the agriculture purpose structure which falls within the tower footprint area which requires removal of structure shall be determined by involving the Certified Chartered Engineer and the compensation shall be estimated for construction of the similar structure with same dimensions. The compensation value shall be agreed by the affected person.

Standing crops

For annual crops, the specific formula shall be used to calculate compensation rates based on Full replacement cost is as follows:

Full Replacement cost for Annual Crops = $[(A \times B) + C \text{ as } 0] \times D$

Where:

A = market value of the crop per unit of production

B = Yield (total number of units produced per hectare)

C = Value of agricultural inputs used to produce the crops (set at zero as input costs are considered within the Market Value unless otherwise noted)

D = Area under cultivation

Therefore, Base Compensation Value = $[(A \times B) + C \text{ as } 0]$ and the crop compensation shall be calculated by multiplying the same with D.

Trees

Privately owned trees by landowners and land users along the transmission line alignment shall be identified as part of the land and asset survey. They will be categorized as fruit, timber trees and fodder/fuel or other forest produce. After identification of tree, type, their maturity, the agronomist (with forestry experience) who will be responsible for tree counting process will establish unit rates. The rates shall be agreed by the affected person.

Task 5: Stakeholder Engagement Plan and Stakeholder Engagement Activities

E&S Advisors proposes a stakeholder engagement program that covers three rounds of engagement:

- **Project introduction:** Given there has been limited engagement on the Project, E&S Advisors' engagement team will hold meetings with key stakeholders to introduce/update them on the Project and to introduce the project planning process. Stakeholders will include competent authorities and community members.
- **Baseline data collection:** Qualitative baseline data will be collected immediately after the Project introduction from a sample size of the Project site to characterize the wider social environment. Quantitative data will also be collected from all (100%) identified Project Affected People (PAPs) as part of the LRP data collection. During baseline data collection, E&S Advisors will also assess how prepared PAPs

are for the physical or economic displacement and aim to understand the extent of informal settlers (if any) in the Project area.

- **Engagement on draft LRP:** An overview of impacts, mitigation measures, and entitlements will be presented to key stakeholders during this final round of engagement to be managed by E&S Advisors and SAEL. Inputs by stakeholders will be incorporated into the final LRP documentation. Engagement on the draft LRP will include the same stakeholders as in the Project introduction engagement and any additional stakeholders identified during the process.

The Grievance Mechanism will be explained in all rounds of engagement. Stakeholder engagement will be guided by a Stakeholder Engagement Plan (SEP), which will support all official engagement with competent authorities. It is assumed that SAEL will facilitate all disclosure engagement on the final LRP with concerned stakeholders. E&S Advisors will develop the necessary materials for engagement, including a Project information leaflet, summarising the Project and its impacts.

The SEP will include stakeholder mapping and key stakeholders to be engaged throughout the process, including those considered particularly vulnerable to the Project and who may require specific measures to support their participation in engagement activities. The SEP will also describe the Grievance Mechanism for the Project and how PAPs will be able to access it. E&S Advisors will build on any existing Grievance Mechanism for the Project to ensure it is fit for purpose.

The SEP will be a “living document” and will be updated as the LRP progresses. A first draft will be produced prior to the Project introduction and baseline data collection and updated following these activities. A second draft will be produced following engagement on the draft LRP. This revision will incorporate key comments and feedback made during this final round of engagement. This revision will also include a summary of engagement required throughout the lifetime of the Project.

Task 6: LRP Report- Completion of the LRP Report

The data obtained through the census, socio-economic surveys/asset surveys will inform the assessment on impacts and losses associated with the proposed Project site and transmission line route. A chapter on Consultation will be drafted and include a summary of all engagement on the LRP as well as key issues and concerns raised by stakeholders.

The draft LRP report will also incorporate a chapter on implementation, setting out key tasks for implementing the LRP including:

- A process for the establishment of Livelihood resettlement implementation committees;
- Recommendations on the proposed LRP implementation team (including key roles and responsibilities);
- LRP implementation schedule, draft budget that includes proposed compensation packages to full replacement cost and eligible allowances;
- A process for completing engagement on livelihood restoration (which we recommend is agreed with Lenders and Client);
- An overview of the grievance mechanism; and
- An overview of the monitoring and evaluation framework.

5 Chapters for LRP

The LRP (Livelihood Restoration Plan) report will be organized into the following chapters to provide a comprehensive overview of the project's impact on land use, stakeholder engagement, and mitigation strategies. Each chapter will address specific aspects of the land rehabilitation process, ensuring a structured and detailed approach:

Executive Summary,

Chapter 1: Project Description and introduction to the LRP report;

Chapter 2: Scope of Land Acquisition and Resettlement impacts;

Chapter 3: Socioeconomic Information and Profile;

Chapter 4: Information Disclosure, Consultation, and Participation;

Chapter 5: Grievance Redress Mechanisms;

Chapter 6: Overview of applicable legal frameworks and policies;

Chapter 7: Entitlements, Assistance and Benefits;

Chapter 8: Income Restoration and Rehabilitation;

Chapter 9: Budget and Financing Plan, other institutional measures, and responsibilities;

Chapter 10: Implementation schedule including monitoring and evaluation of LRP progress; and

Chapter 11: Mechanisms and benchmarks appropriate to the project for monitoring and evaluating the implementation of the resettlement plan

6 Work Plan

A tentative timeline is suggested for the completion of the LRP

S.N.	Tasks	Weeks							
		1	2	3	4	5	6	7	8
1	Kick off Meeting								
2	Project Information as per IRL by SAEL								
3	Tool and Checklist Development								
4	Site Mobilization and Training of Surveyors								
5	Baseline and Census & Asset Surveys								
6	Assessment of Market valuation								
7	Compilation, analysis and inferences of field survey data								
8	Draft LRP					*			
9	Final LRP						##		

within 2 weeks of receiving comment from the client

*** denote deliverables**

APPENDIX 6: TRAFFIC MANAGEMENT PLAN

SAEL should customize the traffic management plan with relevant details as per site specifications prior to construction and operation phase. The Traffic Management Plan will be customized at later stages, when SAEL will finalize third party contractors for transportation of raw materials during construction and operation phase. SAEL to include the following information in the project specific traffic management plan to be developed prior to construction and operation phase:

- Traffic Management inside the Plant
- Traffic Management for the transportation of raw material and movement of staff
- Traffic Management for pedestrian
- Any effect on existing neighboring property traffic or access.

Traffic Management

The projects in construction and operation phase will add to traffic on the access roads in the morning and evening hours. Following mitigation measures shall be incorporated:

- Proper management of vehicular movement within the site, especially during peak hours;
- Different time slots will be allotted to different suppliers. The same will be conveyed to all to prevent any inconvenience to others.
- SAEL shall ensure adequate lighting is provided within the plant premises
- Stopping/Parking of vehicles in between the roads to be discouraged.
- Pedestrians walkways to be adequately marked with proper zebra crossings.
- Loading/ unloading area will be located within the plant premises. Entry/ exit of all the vehicles will be made via the entry area designated by SAEL. Vehicular movements within the premises will be managed by trained traffic management operatives. All vehicles will enter and exit the site premise in forward facing direction. It will be ensured that vehicle driver is aware of the plant layout and safe working procedures within the plant premises.
- The movement of heavy, wide or slow-moving loads will be planned at times when traffic volume on the roads concerned is least.
- Appropriate supervision will be provided to control flow of traffic when machinery needs to crossroads.
- Wheel washing on site and road sweeping will be carried out to keep the local highway clear of mud and debris.
- Training and testing of heavy equipment operators and drivers, including vision tests, with records kept of all trainings.
- SAEL shall dedicate a separate area for staff who will require daily access parking area within the Plant. Dedicated parking area for visitors shall be provided.

Community Safety

- Vehicle route planning and alternative route map will be prepared and explained to the drivers
- Impose and enforce speed limits (20 km/h on the internal access road and max speed limit of 80 km.hr on NH) on all haulage vehicles operating on haul routes
- Vehicles carrying fine and coarse materials like sand, gravel, cement etc. will be covered appropriately so as to avoid any deposition of loose materials on approach roads.
- Dedicated pedestrian route will be provided and vehicles will not be allowed to use pedestrian space. In case pedestrian have to use vehicle route safe crossing will be provided.
- Maintaining records of all accidents involving project vehicles and implementing a traffic complaint and corrective action procedure.

- Liaison with the police and other authorities prior to the movement of any abnormal loads or any over dimensioned consignment.
- If road closures are required, diversions will be planned and communicated to the authorities and affected communities in advance. All diversion will be constructed to the specifications of the applicable road authority and will be maintained in good drivable conditions until the completion of the re-instatement work.
- The vehicles entry will be via identified gates/routes and will make use of dedicated route to the loading/unloading area/ parking area. Sufficient number of loading/ unloading bays will be provided. A dedicated area for the turning of such vehicles will (if feasible) be formed and a banksmen (helper) will oversee these movements whilst vehicles are maneuvering.
- A detailed plan for signage around the construction and operation areas to facilitate traffic movement, parking facilities, provide directions to various components of the works, provide safety advice and warnings will be prepared. All signs shall be posted in both English and regional dialect.
- The parking of vehicles along footpaths, single lane roads shall be prohibited on community roads and public roads in the vicinity of the project site.
- The project traffic or any project activity will not obstruct the access to neighbouring properties.
- Ambulance and fire services will be consulted regarding road diversions. Road diversions will not increase the response time of these services to local communities.
- Clear road markings like reflective paint and signs should be used to alert pedestrians and vehicle operators to traffic hazards in the plant. Signs may indicate:
 - Entry point
 - Exclusion and safety zones
 - Parking and no parking zones
 - Speed limits
 - Vehicle crossings
- Signs and road markings should be regularly checked and maintained so they can be easily seen and read and sealed when they fade.

Vehicle Maintenance & Management

In order to minimise the accident rates and the overall transport fuel consumption, SAEL will ensure that the vehicle fleet working is maintained according to the manufacturers' specifications. This shall include the compliance of all vehicles with all safety related specifications (such as the fitting of the correct tyres, with adequate reserves of tread, safe for movement in snow areas, inflated to manufacturer recommended levels), as well as mechanically maintaining vehicles to manufacturer specifications so as to minimise fuel consumption as well ensure safety on road.

SAEL will ensure the following in respect of vehicle maintenance, noise and emission standards:

- All vehicles shall be maintained so that their noise and emissions do not cause nuisance to workers or local people.
- An up-to-date database of all vehicles and construction equipment's deployed at the project site will be maintained. The database will contain details about the periodical maintenance, schedule of maintenance, vehicular emission and noise emission testing done as per Indian regulatory requirements, copy of PUC certificates etc.
- New vehicles/equipment purchased 'as new' after contract award shall comply with emission standards in force on the purchase date.
- Older vehicles/equipment not purchased 'as new' after contract award shall be maintained so that noise and emissions levels are no greater than when the vehicle/ equipment was new.
- Avoidance of passage through and near settled areas during night time hours.
- Oil and fuel leaks must be addressed within 24 hrs of observation or reporting on any vehicle or construction equipment.
- Vehicle maintenance and management parameters will form a critical component of key performance indicator for the contractor responsible to maintain their vehicles.

- All heavy vehicles like cranes, battery operated trolleys etc. will be provided with reversing siren.
- Provision for dedicated parking area will be made near the project office for parking the private vehicles of construction personnel.
- Concrete paved areas will be provided for parking of vehicles and overhaul provisions will be made for any accidental spill of oil or fuel during parking or whenever the vehicle is idling
- Sufficient parking area will be provide within the Plant or sufficient parking space will be provided outside the premises. Parking outside the Plant will be managed by SAEL and will be ensure that transportation vehicles do not cause inconvenience to the surrounding community.

Vehicle Co-ordination

- Different time slots will be allotted to different suppliers. The same will be conveyed to all to prevent any inconvenience to others

Driver Training

The project EHS requirements and Indian regulatory requirements specify the requirements for driver training. SAEL along with EPC contractor will ensure that all drivers and driver trainers are suitably trained in accordance with driver training requirements.

The following issues and documents are to be addressed during driver training in a language (regional dialect) mostly understood by drivers:

- Trip Management Plan;
- Daily pre-use vehicle inspection by the driver;
- Safety kit in vehicle;
- Health and Safety Standards and Practices and;
- National and local legal requirements to drive a vehicle.

Unauthorised passengers in project related vehicles will be strictly prohibited. All the personnel who drive vehicles as a part of contract will have to be in possession of a driving license and will adhere to the general Driver's Safety code and Passenger's Safety code.

Drivers of project vehicles will be required to undertake first aid training and all project vehicles will carry first aid kit which should be adequate to cater for the number of passengers present on the vehicle.

Periodic Road Safety Trainings will be provided to the driver, to ensure smooth transportation of materials during construction and operation phase.

APPENDIX 7: GENDER ACTION PLAN

Introduction

A Gender Action Plan (GAP) is a strategic framework that aims to promote gender equality and address gender-specific challenges in various sectors. It ensures that gender perspectives are integrated into all aspects of planning, implementation, monitoring, and evaluation of projects or policies. GAPs are used by governments, organizations, and international institutions to empower women, improve their access to opportunities, and reduce gender-based disparities. In keeping with this understanding of the role and status of women in the community, a specific gender action Plan has been formulated.

The purpose of the GAP is to maximize the involvement of women in the action items thus identified, and to minimize the possibilities of increasing the vulnerability of women in project implementation by implementation of these plans.

Vision and Objectives

- Ensure equal opportunities and treatment for all genders in project planning, implementation, and outcomes.
- Identify and mitigate risks that disproportionately affect women and marginalized genders, including those related to gender-based violence (GBV).
- Increase the involvement of women in decision-making processes and leadership roles within projects and initiatives.
- Support economic opportunities for women, including access to resources, training, and employment.
- Integrate gender analysis into project design, implementation, and evaluation to ensure gender-responsive outcomes.
- Collect and analyze gender-disaggregated data to inform policies and track progress on gender-related objectives.
- Ensure that women and vulnerable groups have access to essential services, including healthcare, education, and social support.
- Conduct consultations that are inclusive and responsive to the needs of diverse groups, ensuring their voices are heard.
- Create accessible and gender-sensitive grievance redress mechanisms to address concerns related to gender impacts effectively.
- Enhance awareness and build capacity among stakeholders on gender issues, fostering a culture of gender sensitivity within organizations and communities.

Applicable Reference Framework

AIIB Environmental and Social Framework

The AIIB Environmental and Social Framework (ESF) is a comprehensive set of policies and procedures designed to guide the Asian Infrastructure Investment Bank (AIIB) in managing environmental and social risks associated with its projects. The ESF aims to promote sustainable development by ensuring that projects financed by AIIB adhere to high standards of environmental protection and social responsibility.

Key components of the ESF include:

1. **Environmental and Social Policy (ESP):** Outlines AIIB's commitment to safeguarding the environment and social well-being of affected communities.

2. **Environmental and Social Standards (ESSs):** Specific guidelines that define the requirements for managing various environmental and social risks, including those related to labor, land acquisition, resettlement, and community health.
3. **Stakeholder Engagement:** Emphasizes the importance of involving affected communities and stakeholders in the decision-making process, ensuring their voices are heard and considered.
4. **Gender Considerations:** Addresses gender-specific risks and opportunities, promoting gender equality and the empowerment of women throughout project implementation.
5. **Monitoring and Reporting:** Establishes frameworks for ongoing monitoring of project impacts and effectiveness, ensuring compliance with environmental and social standards.

The ESF was amended in November 2022 to enhance its effectiveness and adapt to emerging challenges in environmental and social governance. Overall, the AIIB ESF seeks to ensure that projects contribute positively to sustainable development while mitigating potential adverse impacts on people and the environment.

Gender considerations within the AIIB Environmental and Social Framework (ESF) are designed to ensure that the needs, rights, and perspectives of both women and men are recognized and addressed throughout the project lifecycle. This approach is essential for promoting gender equality and empowering women in the context of development initiatives.

Key elements of gender considerations in the ESF include:

1. **Identification of gender-specific risks and opportunities:** The framework emphasizes the need to identify and assess risks that disproportionately affect women, such as barriers to accessing resources, employment opportunities, and decision-making processes. It also seeks to recognize opportunities for promoting women's participation and benefits in projects.
2. **Inclusion in stakeholder engagement:** The ESF encourages active engagement of women in consultations and decision-making processes. This includes ensuring that women's voices are heard and considered when planning and implementing projects, thereby fostering inclusive dialogue that reflects the needs of the entire community.
3. **Capacity building and training:** The framework promotes targeted training and capacity-building initiatives aimed at enhancing women's skills and capabilities. This can help empower women economically and socially, enabling them to take advantage of new opportunities arising from project implementation.
4. **Gender-responsive policies and programs:** AIIB encourages the development of policies that specifically address gender issues, including the design of programs that support women's access to education, healthcare, and economic resources. This also includes addressing potential risks of gender-based violence and harassment in project settings.
5. **Monitoring and evaluation:** The ESF requires the collection of gender-disaggregated data to monitor the impacts of projects on women and men separately. This data is critical for assessing whether gender equality objectives are being met and for making necessary adjustments to project strategies.
6. **Grievance mechanisms:** The framework calls for the establishment of grievance redress mechanisms that are sensitive to gender issues, ensuring that women can safely report concerns related to discrimination or harassment and receive appropriate support.

By integrating these gender considerations, the AIIB aims to ensure that its projects not only minimize negative impacts on women but also actively promote their empowerment and enhance gender equity in the communities it serves.

National Regulations

- Equal Remuneration Act, 1973 provides for payment of equal remuneration to men and women workers for the same work of similar nature without any discrimination. To ensure social security to the workers including women in the unorganized sector, the Government has enacted the Unorganized Workers' Social Security Act 2008.
- The Maternity Benefit Act, 1961 and The Maternity Benefit (Amendment) Act, 2017 regulate employment of women in certain establishments for a certain period (26 weeks) before and after childbirth and provides for maternity and other benefits.
- The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act (POSH), 2013 has been enacted, which covers all women, irrespective of their age or employment status and protect them against sexual harassment at all workplaces both in public and private sector, whether organized or unorganized.
- Additionally, India has also ratified various international conventions and human rights instruments committing to secure equal rights of women. Key among them is the ratification of the Convention on Elimination of All Forms of Discrimination against Women (CEDAW) in 1993.

Background information on gender from secondary source

The data from Y.S.R., Anantapur, and Kurnool districts highlights significant regional disparities in sex ratios, literacy rates, workforce participation, and substance use, reflecting broader socio-economic conditions.

Sex ratios vary widely, with Chamaluru having a notably low ratio of 902, while Jogapuram shows a higher balance at 1,097. The child sex ratio in Erragudi stands out at 1,205, indicating better survival rates for female children, which could point to more favorable conditions for girls in that area. However, overall gender balance remains a concern, particularly in areas with lower ratios.

Literacy rates reveal stark contrasts between project and buffer villages, with the latter generally achieving higher educational attainment. For instance, male literacy reaches 82.06% in Talaricheruvu, while Sirigepalle shows only 57.82%. Female literacy also lags in project villages, highlighting the need for targeted educational interventions.

Workforce participation reflects these educational disparities, with female participation peaking at 53.35% in Erragudi but dropping to 34.94% in Talaricheruvu. This variation suggests that economic opportunities and societal norms play crucial roles in women's employment across different regions.

The analysis also indicates that women's political participation is increasing due to reserved seats in local elections, yet the actual impact remains variable. While legal protections for property rights exist, societal norms still hinder women's access in practice.

Additionally, substance use trends show a significant gender disparity, with men exhibiting higher rates of tobacco and alcohol consumption compared to women. This underscores the need for public health initiatives to address these issues, particularly in rural areas.

Overall, the data suggests a pressing need for targeted interventions to improve educational outcomes, economic opportunities for women, and public health initiatives, especially in the less advantaged areas. Addressing these disparities is essential for fostering sustainable development and gender equality in the region.

Gender Action Plan

Sl. No.	Focus Area	Measures	Timeline	Monitoring Mechanism		Roles and Responsibility
				Methods	Frequency	
1	Encouraging women's Participation in Public Meetings	<p>The Environmental and Social Impact Assessment (ESIA) and Stakeholder Engagement Plan (SEP) developed for the project outline specific requirements for engaging local communities and various stakeholders to minimize project-related impacts. As part of these plans, SAEL will ensure that women are actively involved in public meetings and discussions related to the project, particularly during the Consultation process. Engaging women is crucial to identifying any gender-specific issues that may arise as a result of the project. The following measures can be implemented:</p> <ul style="list-style-type: none"> • Offer transportation assistance to help women attend. • Facilitate meetings to promote equal participation. • Train facilitators to encourage women's contributions. • Create anonymous feedback channels for women's input. • Hold follow-up sessions to maintain engagement. • Recognize women's contributions during discussions. • Collaborate with local women's organizations for promotion. 	Continuous	Maintain records of attendees of each meeting	As per meeting schedule	SAEL Technical Team
2	Women's Awareness towards Project Activity	As part of the Stakeholder Engagement activities, various meetings will be held to sensitize the local public and disclose project-related information. This plan includes involving women in these meetings and potentially organizing separate gatherings for women's groups. Through these engagement efforts, the aim is to raise awareness among women about issues such as potential in-migration resulting from the project, the code of conduct for workers, risks related to human trafficking and sexually transmitted diseases, the potential for accidents due to increased vehicular movement,	Continuous	Disclosure of Project Information and monitor/evaluate the effectiveness of the programme	As per the requirement of the project	SAEL Technical Team

		<p>and the safety and security measures in place for women. The following measures can be implemented:</p> <ul style="list-style-type: none"> • Conduct awareness campaigns to educate women about project activities and their potential impacts. • Organize workshops and information sessions specifically for women to discuss project details. • Engage women leaders and community representatives to help disseminate information effectively. • Provide training on relevant topics, such as safety measures, economic opportunities, and rights related to the project. <p>- Create feedback mechanisms to gather women’s concerns and suggestions about project activities. - Offer incentives for participation in awareness activities, such as meals or transportation reimbursement. - Establish support groups for women to discuss project-related issues and share experiences. - Monitor and evaluate the effectiveness of awareness initiatives to ensure continuous improvement.</p>				
3	Women in LRP Entitlements	<p>Livelihood Restoration Programs (LRP) will be developed to assist individuals and communities that lose land, assets, or livelihoods due to infrastructure or development projects. Ensuring women's participation in LRP entitlements is essential for promoting gender equity and ensuring that women receive equal benefits from these programs. Key aspects of LRP involvement include equal access to compensation, participation in decision-making, and women-focused capacity building and training. Beneficiary selection will be carried out to ensure that women benefit equally. In cases where a Project-Affected Family (PAF) receives multiple entitlements and women and men identify different benefits, the project will accommodate these differences to the extent possible. The following recommendations can be implemented:</p>	Continuous	Development of LRP	For the Project site and Transmission Line	SAEL Technical Team

		<ul style="list-style-type: none"> • Ensure equal access to Livelihood Restoration Plan (LRP) entitlements for women by implementing gender-sensitive beneficiary selection criteria. • Facilitate women’s participation in decision-making processes related to LRP entitlements. • Create awareness campaigns to inform women about their rights and available entitlements under the LRP. • Establish a dedicated support team to assist women in navigating the LRP application process. • Monitor and evaluate the distribution of entitlements to ensure women benefit equally. • Organize community meetings to discuss LRP entitlements specifically with women, ensuring their voices are heard. • Foster partnerships with local women’s organizations to facilitate access to resources and support. • Collect gender-disaggregated data to track participation and impact of LRP entitlements on women. 				
4	Employment Opportunities	<p>SAEL's recruitment procedures and contractor management practices, along with contractor agreements, should incorporate a comprehensive framework of strategies aimed at actively involving the female workforce and promoting gender equality in the workplace. This framework should outline specific measures to ensure that women are prioritized for employment opportunities at all levels, from entry-level positions to leadership roles.</p> <p>By doing so, SAEL can foster a diverse and inclusive work environment that not only supports women's professional development but also enhances overall organizational performance. The recruitment strategies may include targeted outreach to women’s organizations, training programs designed to build skills among female candidates, and the establishment of mentorship initiatives to guide women in their career advancement.</p>	Continuous	<ul style="list-style-type: none"> - Revised contracts - Added Code of Conduct document - Training Participants Lists - Records of number or percentage of men and women labor (skilled and unskilled) days 	Quarterly	SAEL Technical Team

		Additionally, contractor agreements should specify expectations regarding gender diversity and inclusion, holding contractors accountable for implementing these practices within their own workforce. This holistic approach will help create a more equitable workplace, contributing to the empowerment of women and the overall success of SAEL's projects.				
5	ESMP/ LRP Implementation	<p>It will be ensured that decision-making related to the implementation of the Environmental and Social Management Plan (ESMP) and Livelihood Restoration Plan (LRP) prioritizes issues such as providing local employment opportunities, training and capacity building initiatives, selecting beneficiaries, determining training duration and location, identifying types of training, and establishing support linkages with government schemes, all with a special emphasis on enhancing women's participation.</p> <p>To achieve this, SAEL will include women representatives in the ESMP/LRP implementation team, ensuring that women's perspectives and needs are effectively integrated into the planning and execution processes. This inclusion is crucial for fostering an environment where women feel empowered to contribute and benefit from these initiatives.</p> <p>Additionally, SAEL will actively seek and incorporate feedback from women throughout the implementation of the LRP and ESMP. This will involve establishing mechanisms for women to voice their opinions and experiences, ensuring that their insights are reflected in the project's actions. By emphasizing women's involvement and feedback, SAEL aims to create a more inclusive and equitable approach to the implementation of these plans, ultimately leading to better outcomes for the entire community.</p>	Continuous	Implementation of the Social Management Plans	Monthly basis	SAEL Technical Team
6	Prevention of Sexual Harassment and Internal	SAEL has established a Policy on the Prevention of Sexual Harassment to foster and maintain a safe working environment for women in the workplace. This policy focuses on preventing sexual harassment, raising awareness about the issue, and	Continuous	Maintain records of any reported incident	On incident basis	SAEL Technical Team

	Complaints Committee (ICC)	assuring employees that they can rely on the organization's support to address any concerns related to sexual harassment. In accordance with "The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013," SAEL has formed an Internal Complaints Committee (ICC). The policy outlines procedures for filing complaints, the inquiry process, confidentiality measures, and other relevant details.				
7	Improving Working Conditions in a gender responsible manner	<p>Ensuring that employees' physical environments are equitable is essential for promoting gender equality in the workplace. This includes providing transportation services that are safe and accessible for women, as well as ensuring that construction sites are equipped with adequate facilities such as changing rooms, toilets, and sinks.</p> <p>By prioritizing these amenities, SAEL can create a more inclusive environment that addresses the specific needs of women, thereby fostering their participation in the workforce. For instance, well-designed changing facilities and separate, hygienic toilets can significantly improve the comfort and safety of female workers, making it easier for them to engage fully in their roles.</p> <p>Recognizing the challenges faced by women and children residing in temporary construction camps, several welfare provisions are recommended to support their needs. During the construction phase, suitable residential accommodation is to be provided for the families of laborers, ensuring a safe living environment.</p> <p>To address health concerns, temporary health centers are to be established, staffed with a visiting doctor, nurses, and general duty staff, offering essential medical services and vaccinations for children.</p> <p>A day crèche is to be made available for mothers working on-site, staffed by trained personnel who will care for infants and small children, ensuring their well-being while mothers engage in construction activities.</p>	Continuous	Maintain checklist for services provided and working conditions	Daily, weekly, and monthly	SAEL Technical Team

		Additionally, construction schedules are to be managed to minimize night shifts for women whenever possible. Finally, educational facilities, such as primary schools or evening classes, are to be organized near the construction camps to accommodate the children of mobile worker families, ensuring their access to education.				
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APPENDIX 8: CONTRACTOR AND SUPPLIER MANAGEMENT

Introduction

The management plan defines responsibilities of the project and provides requirements for selection and monitoring of subcontractors and suppliers by the project and its contractors. The purpose of these requirement is to minimize or eliminate risk to the environment and health & safety, and social (EHS&S) through the Project phases. This plan contains information regarding the procedure of selection of contractor and suppliers, contractual agreement, safeguards on EHS&S aspects, regular monitoring and reporting of EHS&S aspects.

Purpose and Scope of the Plan

The management plan is intended to outline the relationship between the project and its contractors and sub-contractors, and to describe the process on how the overall contract will be managed.

In further details, the scope of the management plan is to:

- Summarize the contractors and sub-contractors' engagement and management processes, procedures and systems used
- Set out the procedure for selection of sub-contractors and suppliers by adopting commitment, capacity and track record methodology
- Set out the processes to ensure the implementation, by sub-contractors, of all requirements, their commitments, conditions and procedures – intended to assure the work to be done in compliance of the Applicable Reference Framework of this IESE
- Define monitoring and reporting procedures including Key Performance Indicators (KPIs), to monitor the performance of sub-contractors and suppliers

Sub-contractors and Supplier's selection, Contracting and Induction

SAEL and its contractors shall adopt the sub-contractor and suppliers process that will involve a multidisciplinary team, with one (1) or more qualified EHS&S professional. The participation and engagement of the EHS&S professional in the selection process is aimed to providing an early consideration of EHS&S matters and variables. SAEL has a responsible sourcing policy which will be followed prior to sourcing of raw materials especially solar panels and related components.

Prequalification

The contractors should be asked to provide details including (but not limited to):

- Past EHS performance
- Provision of E&S Policies and management systems
- Number and qualification of EHS&S personnel
- Occupational health and safety procedures and controls
- Human Rights Policies and code of conduct
- Grievance Redressal Mechanism, including means to address harassment
- Human Rights safeguard policy or system
- Supply chain management as criteria for inclusion (specific consideration for child and forced labour).

The number of documents, and level of information and detail that are requested to sub-contractor(s) shall be commensurate to the scope of work and other specific features that the sub-contractor(s) is being pre-qualified against.

Request for Proposal from Sub-contractor(s) and supplier(s)

The section will provide the details of the general EHS&S requirements to come in the Request for Proposal (RfP) for all the sub-contractor(s) and suppliers.

General Requirement for all Sub-contractors

SAEL and its contractors shall include following general EHS&S requirement in the RfP or other solicitations to prospective all categories of sub-contractors:

- Documentation showing compliance with in-country EHS&S legal requirements
- An affirmative statement or other commitment by prospective sub-contractor(s) that they will be responsible for EHS&S performance of their appointed contractors and suppliers

Raw material and other material supplier(s)

The specific requirement on EHS&S aspects for raw material and other materials suppliers are provided below:

- Provide a copy of the supplier(s)' environmental, health & safety and social policies
- Provide details of any accreditation related to EHS&S such as (but not limited to) ISO 14001/OSHAS 18001 and/or alignment with ISO 26000, and other social responsibility standards/guidelines/formal initiatives
- Organisational chart that shows how EHS&S issues are managed
- Provide appropriate EHS&S metrics for the past three (3) calendar year, including spills, releases to the environment, number of labours related or environmental fines or regulatory administrative processes
- Provide appropriate health and safety metrics for the past two (2) calendar years, including:
 - Total recordable fatalities
 - Total recordable injury frequency rate
 - Total recordable disease frequency rate
- Provide details on how the supplier(s) typically manages solid waste, both hazardous and non-hazardous, generated by its activities
- Provided details on how the supplier(s) typically manages wastewater generated by its activities
- Supplier should not procure / produce from conflict zones and places / contractors which involved in child or forced labour / human trafficking.

Contractor(s) for Providing Human Resources

The specific requirement on EHS&S aspects for sub-contractor(s) providing human resources are provided below:

- Provide details of any accreditations such as (but not limited to) ISO 26000, and other social responsibility standards/guidelines/formal initiatives
- Provide details of the sub-contractor(s) HR policies and grievance mechanism, and describe how there will be communicated to all workers on-site
- Provide details on how the sub-contract(s) will comply with national labour and employment laws
- Provided information on past social and labour performance. The information required from sub-contractor(s) include (but not limited) to past violation of labour regulations, reports of sexual harassment or discrimination, training provided on applicable laws and regulations and labour inspection reports
- Provide details how the sub-contractor(s) will manage equal opportunities and non-discrimination, sexual harassment issues, migrant labour and retrenchment among its workforces
- Provide details of the sub-contractor(s)' policy for adequate protection of human rights of workforce

Proposal Evolution and sub-contractor(s) and supplier(s) selection

SAEL and its contractor shall establish an evaluation criterion alongside the RfP and that these are included with the RfP so that contractor(s) and supplier(s) can see early on the relative weightings of the EHS&S aspects of their proposal.

Evaluation methodology, criteria, KPIs and weightings will be established in discussion with the Project team and EHS&S team. Primarily, the evaluation will be done based on the contractor(s)' and suppliers' existing policies,

their capacity to implement EHS&S requirements, and the provided information on past EHS&S performance shall be among the key criteria to evaluate.

While the evaluation methodology will vary according to the different category of contractor(s), scope of work, and any specific features, it will be agreed on by the project team and EHS team. However, at minimum following will be considered as grounds for disqualification:

- Failure to provided information on past E&S performance, including health and safety records
- Reports of past performance deemed unacceptable for the current phase of the Project
- Notices of material labour issues between workers and management
- Fines and sanction imposed by EHS and labour regulators and authorities
- Material community grievances and high-profile adverse press report on EHS&S matters

Further, among the team evaluating proposal at least one (1) qualified and experienced EHS&S professional who have been involved in the development of RfP and the establishment of the criteria that be used to evaluate contractor(s) and supplier(s)' EHS&S qualifications.

Contracting

Based on the pre-qualification (commitment, capacity and track record analysis) and selection procedure, the identification of EHS&S plans to be developed by the contractor(s) will be identified. The same plans will be incorporated in the EHS&S conditions of the contract. The EHS&S condition will have all EHS&S management plans and associated documentation that must be prepared or refined and implemented by the sub-contractor(s) and require that these documents by submitted for review and approval of SAEL within an agreed timeline.

Specific provisions of EHS&S requirement will be included in the contract only after they are deemed to be acceptable by the evaluation panel, including the EHS&S representative(s) and approved by SAEL management.

General terms and condition for all contractors

SAEL and its contractor shall ensure that their contracts include key EHS&S requirement for all sub-contractor(s) (but not limited to):

- Explicit commitment to compliance with applicable EHS&S rules and regulations, conditions of approval and acquisition of all required permits, license, consent and approval prior to undertaking the activities being permitted or otherwise approved
- Specific to reference of the applicable reference framework of the IESE
- Creation and maintenance of records on EHS&S performance
- Penalties or incentives for EHS&S performance
- Clear contract statement that the contractor(s) is responsible for the EHS&S performance of their appointed contractor(s)
- Statement that invoices of sub-contractor(s) will be approved based on the EHS&S performance of contractor(s), and SAEL and its contractors have authority to temporary or permanently withhold the payment
- Contract statement that on the contractor(s) failure to meet the EHS&S requirements in such a way as to prevent significant impacts to workers, local communities or individual or environmental resources, and on the contractor(s) failure to correct such deficiencies upon receiving proper notice, SAEL has the right to appoint and pay another party to repair damage or otherwise remedy the impacts and reduce payment to the contractor(s) in the amount paid to the appointed such third-party.

Specific EHS&S terms and condition for raw material and other material supplier(s)

- Number and qualification of EHS&S personnel required to be on staff – including those responsible for HR; workers' health and safety; environmental management; community health; safety and security and emergency response
- Monitoring of environmental parameters (such as noise, air emissions and air quality, water flows and quality, waste generation and management) that supplier(s) requires to carry out

Specific EHS&S terms and condition for sub-contractor(s) providing human resources

- Development and adoption of social and labour policies or commitment to adhere to the SAEL EHS&S systems, as necessary
- Number and qualification of EHS&S personnel required to be on staff – including those responsible for HR; worker grievances; and worker accommodation (if provided)
- Induction and training programs for workforce, including training on applicable HR policy provisions, grievance mechanism, and occupational health and safety
- Implementation of a grievance redressal mechanism for workers either through a grievance redressal mechanism implemented and managed by SAEL's contractors or through extending the grievance redressal mechanism of the SAEL

Monitoring of sub-contractors and suppliers

SAEL shall monitor E&S performance of contractors and suppliers, throughout construction, from mobilization through demobilization and operations. The monitoring shall involve both visits to work locations and reviews of records kept by the sub-contractors. The frequency of site visit shall be commensurate with the magnitude of the E&S risks of the activities being carried out and permanence of potential impacts that could result from ongoing activities.

Project E&S personnel should review one or more recent inspection reports and the contractor's previous month's E&S progress report prior to visiting the site to monitor the contractor's E&S performance. Further, Project's E&S personnel shall review contractor reports and follow up as needed to ensure timely resolution of issues of non-compliance with E&S requirements. This may include further communications with contractors E&S personnel, issuance of notices of deficiency or warnings to the contractor. Further, at any stage of construction or operation or other work, if the sub-contractor has not taken appropriate action to achieve compliance with E&S requirements after repeated notices of violation and warnings of noncompliance, and significant E&S impacts are occurring or imminent, the Project should order the sub-contractor to stop work until E&S performance is brought under control and up to acceptable standards

Contractor Monitoring and Reporting

SAEL should require contractor to monitor and keep records on E&S performance in accordance with the applicable E&S management system and plans. This may include monitoring of E&S matters, scheduled and unscheduled inspections to work locations, observations made during routine activities, desk reviews, drills, and any other monitoring protocols implemented by the contractors to ensure E&S compliance. The project E&S personnel must be familiar with the contractor's monitoring and record keeping system so this aspect of the contractor's performance can itself be monitored.

Responsibilities for monitoring need to be clear between the project and contractor, and results (if project and contractor are both collecting data) must be comparable. Project should require contractor to report on E&S performance on at least a monthly basis through the construction phase and once in three (3) months during operation phase. Reported E&S information should include the following:

- Safety*: hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed what is outstanding, and lessons learned.
- Major work*: those undertaken and completed, progress against project schedule, and key work fronts (work areas)
- E&S staffing*: new hires and departures, and listing of current staff and titles
- E&S requirement*: noncompliance incidents with permits and national laws (legal noncompliance), project commitments, or other E&S requirements
- E&S inspections and audits*: by sub-contractor, engineer, or others, including authorities – to include date, inspector or auditor name, sites visited and records reviewed, major findings, and action take

- vii. *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, and skill level (unskilled, skilled, supervisory, professional, management)
- viii. *Training on E&S issues*: including dates, number of trainees, number of trainees, and topics
- ix. *Footprint management*: detail of any work outside boundaries or major off-site impacts cause by ongoing construction – to include date, location, impacts, and action taken
- x. *Details of any security risks*: details of risks the contractor may be exposed to while performing its work – the threats may come from third parties external to the project or from inappropriate conduct from security forces employed either by the project or public security forces
- xi. *External stakeholder grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken – grievances listed should include those received since the preceding report and those that were unresolved at the time of that report
- xii. *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for action to be taken – these should continue to be reported until the Project determines the issues is resolved satisfactorily.

Approving Invoices for Payment

EHS&S Manager or representative will be part of the process for signing of all payment to contractor(s) and supplier(s) EHS&S manager will work closely with the Project manager or finance department to determine if there are any outstanding EHS&S items and whether including the full or partial payment under specific line item of the bill of quantities will be withheld, either temporary or permanently.

E&S Review of Contractor(s) Invoices

- Temporary withholding shall be done in case of repeated minor violation of EHS&S requirement that are not leading to significant impacts on workers, external parties or resources; minor violations that are not corrected after repeated warnings of first-time major violation that can be corrected easily and that have not led to permanent EHS&S impacts. The withheld amounts shall be paid upon sub-contractor(s) correction of the defiance to the SAEL's satisfaction
- Permanent withholding will be done for minor violations that are not corrected after repeated warnings and that could result in significant impacts. Some portion of such withholding may be released upon satisfactory resolution of the issues, but some significant portion will be permanently withheld as a penalty to discourage repeated incidents
- Payment that are withheld either temporarily or permanently will be all or part of the payment specified for a line item in the bill of quantities, which in turn will be the payment due for a separate portion of the total workers. SAEL and its contractor EHS&S personnel will work with the project manager and others as need to arrive at the amount to be withheld This amount will not base directly on the cost of compliance but rather will be somewhat higher than this amount, and based on a specific percentage of the line item in question
- sub-contractor(s) will be notified of the specific amount that must be taken in order to receive further payments for the works in question or to receive payment that has been temporarily withheld.

In case if the contractor(s) does not take timely action to reach compliance with EHS&S requirement, SAEL EHS&S manager and the project manager or finance department will continue to appropriate action to encourage compliance, which could include orders to stop work, withholding of further payments or escalation of the issue to higher management of SAEL. If significant impacts are occurring or imminent. SAEL may notify the contractor(s) that another external party will be brought in to deal with the issue and the payment of the contractor(s) will reduced by the amount paid to the appointed external party

APPENDIX 9: SUPPLY CHAIN UNDERTAKING ON LABOUR AND WORKING CONDITION

Attestation Letter

Date: 05/09/2024

To: SAEL Industries Limited ("Purchaser")

We, the undersigned, acknowledge that AIIB will not finance activities listed on the prohibited investment activities list, under AIIB's Environmental and Social Frame work which includes, among others, production or activities involving forced labor¹ or child labor².

After duly considering the above policy and commitment of AIIB, we have conducted due diligence on the works, goods and services, and related materials and products to be used in the 300 MWp solar photovoltaic power plant being constructed at MHP1, Kumool, Andhra Pradesh by Purchaser ("Project"), and following such due diligence:

(a) we attest and represent that (i) to the best of our knowledge, we are not using (and we have not used, and we will not use) works, goods and services, and related materials and products in the Project, where the production and supply of such products used forced labor or child labor; (ii) we adhere to labor legislation of the Employer's country and require our subcontractors and suppliers for the Project to adhere to the same in the production and supply of works, goods and services, and related materials and products proposed to be used in the Project; and (iii) to the best of our knowledge, the works, goods and services, and related materials and products to be procured and/or supplied by us for the Project do not involve production or activities involving the use of forced labor or child labor;

(b) we attest and represent that our subcontractors, manufacturers and suppliers have confirmed to us separately that to their knowledge, after due enquiry and diligence, the offered works, goods and services, and related materials and products do not involve production or activities involving the use of forced labor or child labor;

(c) we further confirm that should you or AIIB require an audit of our records related to the procurement of works, goods and services, and related materials and products used in the Project, we shall promptly make available to you, AIIB or your respective designated representatives all relevant documents and records to assist with the audit, and grant access, to the extent practicable, to the sites, facilities, plants, and equipment to an independent auditor retained by you or AIIB;


(d) we confirm that if the contract is awarded to us, (i) we shall monitor the works, goods and services, and related materials and products provided by us on an ongoing basis, (ii) require our subcontractors, suppliers or manufacturers to immediately notify to us any incidents of forced labor or child labor, and if new risks or incidents of forced labor or child labor are identified, (iii) we commit to promptly inform you, if we receive information that the representation in (a) is false and of any new risks or incidents of forced labor or child labor in the production or activities for the offered works, goods and services, and related materials and products used in the Project, and to take appropriate steps to remedy them;

(e) we agree that a breach and misrepresentation of (a), (b), (c), or (d) above is a sufficient for the Purchaser to terminate the contract with us, if the contract is awarded to us.

Sincerely,

For [Signature]

Authorized Signature [In full and initials]:
Name and Title of Signatory: Sarvesh Kummelt
Address: land KH. NO. 354/2, New Kh. NO. 844/954
Village - Bator, Tehsil - Kishinagarh, Dist. Ajmer
(Raj.) 305801



¹ Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.

² Child labor means the employment of children whose age is below the host country's statutory minimum age of employment or employment of children in contravention of International Labor Organization Convention No. 138 "Minimum Age Convention" (www.ilo.org).

Attestation Letter

Date: ...3/9/2024.....

To: SAEL Industries Limited ("Purchaser")

We, the undersigned, acknowledge that AIBB will not finance activities listed on the prohibited investment activities list, under AIBB's Environmental and Social Frame work which includes, among others, production or activities involving forced labor¹ or child labor².

After duly considering the above policy and commitment of AIBB, we have conducted due diligence on the works, goods and services, and related materials and products to be used in the 300 MWp solar photovoltaic power plant being constructed at MHP1, Kurnool, Andhra Pradesh by Purchaser ("Project"), and following such due diligence:

(a) we attest and represent that (i) to the best of our knowledge, we are not using (and we have not used, and we will not use) works, goods and services, and related materials and products in the Project, where the production and supply of such products used forced labor or child labor; (ii) we adhere to labor legislation of the Employer's country and require our subcontractors and suppliers for the Project to adhere to the same in the production and supply of works, goods and services, and related materials and products proposed to be used in the Project; and (iii) to the best of our knowledge, the works, goods and services, and related materials and products to be procured and/or supplied by us for the Project do not involve production or activities involving the use of forced labor or child labor;

(b) we attest and represent that our subcontractors, manufacturers and suppliers have confirmed to us separately that to their knowledge, after due enquiry and diligence, the offered works, goods and services, and related materials and products do not involve production or activities involving the use of forced labor or child labor;

(c) we further confirm that should you or AIBB require an audit of our records related to the procurement of works, goods and services, and related materials and products used in the Project, we shall promptly make available to you, AIBB or your respective designated representatives all relevant documents and records to assist with the audit, and grant access, to the extent practicable, to the sites, facilities, plants, and equipment to an independent auditor retained by you or AIBB;

(d) we confirm that if the contract is awarded to us, (i) we shall monitor the works, goods and services, and related materials and products provided by us on an ongoing basis, (ii) require our subcontractors, suppliers or manufacturers to immediately notify to us any incidents of forced labor or child labor, and if new risks or incidents of forced labor or child labor are identified, (iii) we commit to promptly inform you, if we receive information that the representation in (a) is false and of any new risks or incidents of forced labor or child labor in the production or activities for the offered works, goods and services, and related materials and products used in the Project, and to take appropriate steps to remedy them;

(e) we agree that a breach and misrepresentation of (a), (b), (c), or (d) above is a sufficient for the Purchaser to terminate the contract with us, if the contract is awarded to us

Sincerely,

Authorized Signature [In full and initials]: _____
Name and Title of Signatory: Billy XU
Address: Zhejiang Aiko Solar Technology Co., Ltd.No.655, Haopai Road,
Suxi Town, Yiwu City, 322009, China






¹ Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.

² Child labor means the employment of children whose age is below the host country's statutory minimum age of employment or employment of children in contravention of International Labor Organization Convention No. 138 "Minimum Age Convention" (www.ilo.org).

APPENDIX 10: POSH POLICY



POLICY ON PREVENTION OF SEXUAL HARASSMENT OF EMPLOYEES IN WORKPLACES

Release Date	New Policy /Revision	Prepared By	Reviewed By	Approved By
01-12-2023	New Policy	 AGM - HR	 CHRO	 CEO

				Page 1 of 17
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Version: 1.0

Issue Date: 01.12.2023

<https://sael.co/policy/policy-on-prevention-of-sexual-harrasment-of-employees.pdf>

APPENDIX 11: WORKERS' ACCOMMODATION MANAGEMENT PLAN

The requirement of workers' accommodation stems from the type of workforce that will be required during the development and operational phase of the Project. Below guidelines are made with due consideration of European Bank for Reconstruction and Development (EBRD) and International Finance Corporation (IFC) guidelines on workers' accommodation⁶², and the Building and Other Construction (Regulations of Employment and Condition of Service) (BOCW) Act, 1996, which will be followed for accommodation facilities.

Code of Conduct for Workers in Labour Accommodation

Project and its contractor would be recommended to process of addressing issues raised by workers' accommodation. These are:

- Assessing whether housing is needed for the Project and is so, what sort
- Assessing impacts on local communities and planning mitigation of potential negative impacts

If there is no alternative and it is necessary to provided accommodation to workers, then the project and its contractors will rent or construct workers' accommodation facilities for the construction and operation workers, away from the existing local community so as to have a minimum possible adverse impact upon the local community. The code of conduct will maintain for worker accommodation. The details of code of conduct are delineated below:

- Renting arrangement should be fair or free of cost. If it is charged then, adequate, and decent housing should not cost the workers more than a reasonable proportion of their income and should never include a speculative profit
- Worker should not be mandatory required to stay in the accommodation provided by the project or its contractor but should be free to chooses their own if they wish to do so
- Project and its contractor should help to ensure that, where workers obtain their accommodation, they are not being exploited, and offer advice and help as requested
- Project and its contractor should ensure that accommodation which is provided is not overcrowded and does not pose a risk to the health and safety of the workers living there
- Project and its contractor should be entitled to repossess the accommodation within n a reasonable time in the event of the termination of the workers' contract of employment, and the workers should eb entitled to a reasonable period of continued occupancy and/or fair compensation when he/she ceases to exercise his/her employment
- During the time workers spend in the workers' accommodation they should enjoy their fundamental human rights. Workers' accommodation arrangements should not restrict workers' right and freedoms

Further, as per the BOCW Act, 1996, the Project and its contractor shall provide temporary accommodation facilities to the construction laborer free of cost and as soon as construction work is over, the employer at his own cost will remove the temporary structure and restore ground in as it was before.

Dos and Don'ts of Workers' Accommodation

Project and its contractors shall abide by all applicable rules and regulations pertaining to the design and construction of the workers' accommodation building or structure as well as facilities to be provided therein while planning for the accommodation. Further, as suggestive guideline for workers accommodation arrangement based on the EBRD and IFC's guidelines on worker accommodation and BOCW Act as prescribed below:

Standards for workers' accommodation

⁶² https://www.ebrd.com/downloads/about/sustainability/Workers_accomodation.pdf (Accessed on October 13, 2022)

Standard Parameter	Requirement as well monitoring indicators
Location	<ul style="list-style-type: none"> Reasonable distance from the project site Adequate transportation arrangement Reasonable distance from the vulnerable local community
Rooms/Dormitory facilities	<ul style="list-style-type: none"> Rooms/dormitories are aired and cleaned at regular intervals Sanitary facilities are located within the same building and provided separately for male and female workers' Density standards are expressed wither in terms of minimal volume per resident or of minimal floor space. Usual standards range from 10 to 12.5 cubic meters (volume) or 4 to 5.5 square meters (surface) A minimum ceiling height of 2.10 meters shall be provided In case of collective room or dormitory, reasonable number of workers allowed – 2 to 8 workers per room Rooms should be adequate ventilated and lit
Drainage	<ul style="list-style-type: none"> Proper drainage system Avoid Accumulation of stagnant water
Ventilation and lighting	<ul style="list-style-type: none"> Adequate ventilation or air condition system shall be provided Natural Lighting (if available) shall be provided Artificial lighting shall be provided Emergency lighting shall be provided <p>Note: As a best practice the window area shall represent not less than 5% to 10% of the floor area</p>
Water	<ul style="list-style-type: none"> Adequate and convenient water supply Drinking water meeting national and WHO standards Regular monitoring of drinking water <p>Note: Depending on climate, weather conditions and accommodation standards – 80 to 180 liter per person per day should be available</p>
Wastewater	<ul style="list-style-type: none"> Proper discharge of wastewater and sewage Establish Sewage Treatment Plant (STP) if required Solid Waste Management System Pest Control Mechanism <p>Note: In addition, it is best practice to locate rubbish containers 30 meters from each shelter on a wooden, metal, or concrete stand. Such containers must be emptied at regular intervals (to determined based on temperatures and volumes generate) to avoid unpleasant odors associated with decaying organic materials</p>
Toilet Facilities	<ul style="list-style-type: none"> Adequate number of toilets Convenient location Construction of good materials that are easily cleanable Facilities are cleaned frequently and kept in working conditions Separate for male and female except for family accommodation <p>Note on Toilet construction</p> <ul style="list-style-type: none"> An adequate number of toilets is provided to workers. Standard range from 1 unit for 15 persons to 1 unit to 6 persons For urinal, usual standards are 1 unit for 15 persons Standards distance are from 30 to 60 meters from rooms/dormitories
Bathrooms and other Sanitary Facilities	<ul style="list-style-type: none"> Made of anti-slip washable materials Adequate number of bathroom and hand wash facilities Tapes are kept in working condition Convenient location: Separate for male and female except for family accommodation Adequate availability of hot and cold running water

Standard Parameter	Requirement as well monitoring indicators
	<p>Note: Adequate number of shower/bathroom facilities – range from 1 unit to 15 persons to 1 unit per 6 persons</p>
Canteen and cooking arrangement	<ul style="list-style-type: none"> • Adequate space • Constructed of good and easy to clean material • Option for separate cooking facilities • Separate kitchen space shall be provided from sleeping area • Hygiene in canteen/dining halls and cooking facilities • Adequate facilities for cleaning, disinfecting and storage of cooking utensils and equipment's • Adequate food waste disposal <p>Note: canteen shall have a reasonable amount of space per workers. Standard range from 1 square meter to 1.5 square meters</p>
Laundry	<ul style="list-style-type: none"> • Provide Laundry facility • Facilities shall be built in adequate and easy to clean materials
Medical Facilities	<ul style="list-style-type: none"> • Adequate number of first aid kits to the number of residents (workers) • Where possible a 24x7 first aid service/facility shall be made available • An adequate number of staff/workers shall be employed to provide first aid
Workers' rights, rules and regulations on workers' accommodation	<ul style="list-style-type: none"> • Restriction of workers' freedom of movement to and from the site is limited and duly justified. It is good practice to provide workers 24/7 access to the accommodation site. Any restrictions based on security reasons should be balanced by the necessity to respect workers' freedom of movement • Where possible, an adequate transport system to surrounding communities is provided. It is good practice to provide workers with free transportation to project location and from accommodation facility • Withholding workers' ID papers is prohibited • Workers' gender and religious, cultural and social backgrounds are respected. In particular, workers should be provided with the possibility of celebrating religious holidays and observances

Checklist on workers' accommodation monitoring

Detail checklist of workers' accommodation monitoring is provided below:

Checklist on workers' accommodation

Aspects	Yes	No	Not Applicable (N/A)	Comments
Assessing the need for workers' accommodation				
Has there been an assessment of workers' availability in the neighboring communities?				
Has there been an assessment of the skills and competencies of the local workforce and how do those skills and competencies fit the project's need?				
Has there been an assessment of the possibility of training a local workforce in order to fulfil the project's needs?				
Availability of housing				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Has there been a comprehensive assessment of the different type of housing available in the surrounding communities prior to building any workers' accommodation?				
Has there been an assessment of the impact on the communities of using existing housing opportunities?				
Have measures to mitigate adverse impacts on the local housing market been identified?				
Assessing Impacts of workers' accommodation on communities				
Have the potential health and safety impacts and consequences of land acquisition and involuntary resettlement occurring during the construction phase of the workers' accommodation been included in the assessment?				
Have the impacts of workers' accommodation on community infrastructures, services and facilities been included in the assessment?				
Have the impacts on local community's businesses and local employment been included in the assessment?				
Have general impacts of workers' accommodation on communities' health, (notably the increased risk of road accidents and of communicable diseases), and community social cohesion been included in the assessment?				
Does the assessment include appropriate mitigation measures to address any adverse impacts identified?				
Types of workers' accommodation				
Has consideration been given to provision of family accommodation?				
Are individual accommodations comprising bedrooms, sanitary and cooking facilities provided as part of the family accommodation?				
Are adequate nursery/school facilities provided?				
Is special attention paid to providing adequate safety for children?				
Standards for workers' accommodation				
Have the relevant national/local regulations been identified and implemented?				
Is the location of the facilities designed to avoid flooding or other natural hazards?				
Are the living facilities located within a reasonable distance from the worksite?				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Is transport provided to worksite safe and free?				
Are the living facilities built using adequate materials, kept in good repair and kept clean and free from rubbish and other refuse?				
Is the site adequately drained?				
Depending on climate are living facilities provided with adequate heating, ventilation, air conditioning and light systems including emergency lighting?				
Do workers have easy access to a supply of clean/potable water in adequate quantities?				
Does the quality of the water comply with national/local requirements or WHO standards?				
Are tanks used for the storage of drinking water constructed and covered to prevent water stored therein from becoming polluted or contaminated?				
Is the quality of the drinking water regularly monitored?				
Are wastewater, sewage, food and any other waste materials adequately discharged in compliance with local or World Bank standards and without causing any significant impacts on camp residents, the environment or surrounding communities?				
Are specific containers for rubbish collection provided and emptied on a regular basis?				
Are pest extermination, vector control and disinfection undertaken throughout the living facilities?				
Are the rooms/dormitories kept in good condition?				
Are the rooms/dormitories aired and cleaned at regular intervals?				
Are the rooms/dormitories built with easily cleanable flooring material?				
Are the rooms/dormitories and sanitary facilities located in the same buildings?				
Are residents provided with enough space?				
Is the ceiling height high enough?				
Is the number of workers sharing the same room/dormitory minimized?				
Are the doors and windows lockable and provided with mosquito screens when necessary?				
Are mobile partitions or curtains provided?				
Is suitable furniture such as table, chair, mirror, bedside light provided for every worker?				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Are separate sleeping areas provided for men and women?				
Is there a separate bed provided for every worker?				
Is there a minimum space of 1 meter between beds?				
When double deck bunks are in use, is there enough clear space between the lower and upper bunk of the bed?				
Are triple deck bunks prohibited?				
Are adequate facilities for the storage of personal belongings provided?				
Are sanitary and toilet facilities constructed from materials that are easily cleanable?				
Are sanitary and toilet facilities cleaned frequently and kept in working condition?				
Are toilets, showers/bathrooms and other sanitary facilities designed to provide workers with adequate privacy including ceiling to floor partitions and lockable doors?				
Are separate sanitary and toilet facilities provided for men and women?				
Is there an adequate number of toilets and urinals?				
Are toilet facilities conveniently located and easily accessible?				
Is the shower flooring made of anti-slip hard washable materials?				
Is there an adequate number of hand wash basins and showers/bathrooms facilities provided?				
Are the sanitary facilities conveniently located?				
Are shower facilities provided with an adequate supply of cold and hot running water?				
Are canteen, cooking and laundry facilities built with adequate and easy to clean materials?				
Are the canteen, cooking and laundry facilities kept in clean and sanitary condition?				
If workers cook their own meals, is kitchen space provided separately from the sleeping areas?				
Are adequate facilities for washing and drying clothes provided?				
Are workers provided with enough space in the canteen?				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Are canteens adequately furnished?				
Are kitchens provided with the facilities to maintain adequate personal hygiene?				
Are first aid kits provided in adequate numbers?				
Are first-aid kits adequately stocked?				
Is there an adequate number of staff/workers trained to provide first aid?				
Are there any other medical facilities/services provided on site? If not, why?				
Are workers provided with dedicated places for religious observance?				
Management and Staff				
Are there carefully designed worker accommodations management plans and policies especially in the field of health and safety (including emergency responses), security, workers’ rights and relationships with the communities?				
Where contractors are used, have they clear contractual management responsibilities and duty to report?				
Does the person appointed to manage the accommodation have the required background, competency and experience to conduct his mission and is he/ she provided with the adequate responsibility and authority to do so?				
Is there enough staff to ensure the adequate implementation of housing standards (cleaning, cooking and security in particular)?				
Are staff members recruited from surrounding communities?				
Have the staff received basic health and safety training?				
Are the persons in charge of the kitchen particularly trained in nutrition and food handling and adequately supervised?				
Charging fees for accommodation and services				
Are the renting arrangements fair and transparent?				
Are workers provided with adequate information about payment made?				
Where appropriate, are renting arrangements and regulations clearly included in workers’ employment contracts?				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Are food and other services provided for free or reasonably priced, that is, not above the local market price?				
Is the payment in kind for accommodation and services prohibited?				
Health and Safety on Site				
Have health and safety management plans including electrical, mechanical, structural and food safety been designed and implemented?				
Has the accommodation manager a duty to report to the health authority specific diseases, food poisoning or casualties?				
Is there an adequate number of staff/workers trained in providing first aid?				
Has a specific and adequate fire safety management plan been designed and implemented?				
Is guidance on alcohol, drug and HIV/AIDS and other health risk-related activities provided to workers?				
Do workers have an easy access to medical facilities and medical staff, including female doctors/nurses where appropriate?				
Have emergency plans on health and fire safety been prepared?				
Depending on circumstances, have specific emergency plans (earthquakes, floods, tornadoes) been prepared?				
Security on workers' accommodation				
Has a security plan including clear measures to protect workers against theft and attack been designed and implemented?				
Has a security plan including clear provisions on the use of force been designed and implemented?				
Have the backgrounds of security staff been checked for previous crimes or abuses?				
Has the recruitment of security staff from both genders been considered?				
Have security staff received clear instruction about their duty and responsibility?				
Have security staff been adequately trained in dealing with domestic violence and the use of force?				
Are body searches only performed in exceptional circumstances by specifically trained security staff of both genders?				

Aspects	Yes	No	Not Applicable (N/A)	Comments
Do security staff have a good understanding about the importance of respecting workers' rights and the rights of the surrounding communities and adopt appropriate conduct?				
Do workers and communities have specific means to raise concerns about security arrangements and staff?				
Workers' rights, rules and regulations on workers' accommodation				
Are limitations on workers' freedom of movement limited and justified?				
Is an adequate transport system to the surrounding communities provided?				
Is the practice of withholding workers' ID papers prohibited?				
Is freedom of association expressly respected?				
Are workers' religious, cultural and social backgrounds respected?				
Are workers made aware of their rights and obligations and provided with a copy of the accommodations' internal rules, procedures and sanction mechanisms in a language or through a media they understand?				
Are house regulations nondiscriminatory, fair and reasonable?				
Are regulations on alcohol, tobacco and third parties' access to the camp clear and communicated to workers?				
Is a fair and non-discriminatory procedure to implement disciplinary procedures, including the right for workers to defend themselves, set up?				
Consultation and Grievance mechanism				
Have mechanisms for workers' consultation been designed and implemented?				
Have workers subjected to disciplinary proceedings arising from conduct in the accommodation had access to a fair and transparent hearing with the possibility to appeal the decision?				
Are there fair conflict resolution mechanisms in place?				
In cases where serious offences occur, are there mechanisms to ensure full cooperation with police authorities?				
Management of community relations				
Have community relation management plans addressing issues around community development, community needs, community health and safety and community				

Aspects	Yes	No	Not Applicable (N/A)	Comments
social and cultural cohesion been designed and implemented?				
Do community relation management plans include the setting up of liaison mechanisms to allow a constant exchange of information and consultation of the surrounding communities?				
Is there a senior manager in charge of implementing the community relation management plan?				
Is there a senior manager in charge of liaising with the surrounding communities?				
Are the impacts generated by workers' accommodation periodically reviewed, mitigated or enhanced?				
Are community representatives provided with easy means to voice their opinions and lodge complaints?				
<i>Source: Workers' Accommodation: process and Standards – A guidance note by IFC and the EBRD</i>				

APPENDIX 12: HUMAN RIGHTS IMPACT ASSESSMENT

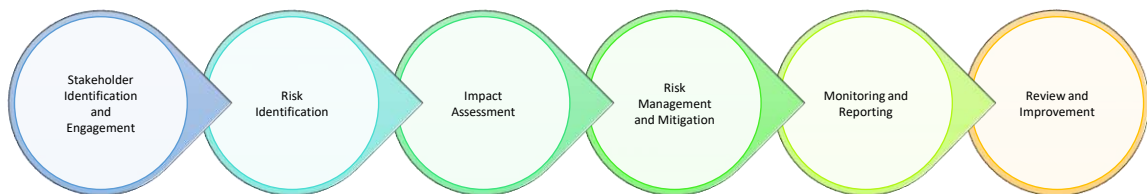
1 Background

M/s SAEL Solar MHP1 Pvt. Ltd (SSMPL) is a privately held company focused on power generation, operating as a subsidiary of SAEL Industries Limited (SIL), which is promoted by SAEL Limited (SAEL). SSMPL has initiated the development of a 300 MW Solar Power Project located in Koduru village, Kondapuram tehsil, YSR District, and Bodaipalle village, Tadipatri tehsil, Anantapur District in Andhra Pradesh. As the project progresses, it is crucial to assess its potential human rights impacts, particularly concerning land use, community engagement, and environmental considerations. Understanding these impacts will ensure that the rights of affected individuals and communities are respected and that the project aligns with best practices in human rights governance.

India has a long tradition of promoting and protecting human rights, reflected in the vision of the nation’s founding fathers who framed the Constitution. The Constitution of India enshrines India’s commitment to human rights by guaranteeing to its citizens fundamental political and civil rights, providing for realization and enforcement of economic, social, and cultural rights. The most basic of several fundamental rights for both citizens and non-citizens is the ‘Right to Life and Liberty’ in Article 21 of the Constitution. As the world’s largest democracy, India’s secular policy is complemented by an independent judiciary, a range of national and state level commissions that monitor compliance with human rights, a free press, and a vibrant and vocal civil society. A series of affirmative measures are in place to help the more vulnerable and marginalized and to address issues of social exclusion, deprivation and disadvantage that may be faced by such groups.

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Human Rights Risk Assessment (HRRRA) based on Equator Principle 4 (EP4) involves evaluating and managing the potential human rights impacts of projects to ensure that they are conducted in a manner that respects human rights and complies with international standards. This framework is designed to guide SAEL in identifying, assessing, and managing risks related to human rights, particularly in the context of the 300 MW solar project. Here’s a detailed framework for conducting HRRRA in alignment with Equator Principle 4:



2 Human Rights: Principles, Responsibilities, and Interdependence

According to the Office of the United Nations High Commissioner for Human Rights, human rights are inherent to all individuals, regardless of their nationality, residence, gender, ethnic origin, color, religion, language, or

any other status. All individuals are entitled to these rights without discrimination. Human rights are interrelated, interdependent, and indivisible⁶³.

Identifying and supporting stakeholders is particularly important for solar projects due to several key factors. First, solar projects often require land use and can impact local ecosystems, making community engagement essential to address concerns about land rights, environmental effects, and resource access. Engaging local communities helps ensure that their voices are heard, fostering trust and reducing the risk of opposition or conflict. Second, solar projects can provide significant economic benefits, such as job creation and local investment. By including low-income groups, women, and vulnerable populations in decision-making processes, the project can ensure that these benefits are equitably distributed, promoting social equity and community resilience. Third, solar projects must comply with environmental and social regulations, making stakeholder engagement critical for achieving necessary permits and maintaining a social license to operate. By involving opinion leaders and community representatives, the project can align itself with local governance and decision-making structures, ensuring smoother implementation. Finally, solar projects are part of a broader transition to sustainable energy. Engaging stakeholders not only helps in identifying potential risks and mitigating negative impacts but also enhances the project's overall sustainability by incorporating diverse perspectives and addressing community needs.

Task 1. Stakeholder Identification and Engagement

- **Local Community:** SAEL will actively engage with local communities to understand their rights, needs, and concerns. This will involve regular consultations and public meetings to gather feedback and address issues related to land, livelihood, and environmental impact.
- **Opinion Holders and Community Leaders:** Key opinion holders and community leaders will be consulted to identify potential human rights risks and gain insights into community-specific issues. Their support and involvement will be crucial for successful project implementation and risk mitigation.
- **Low-Income Groups:** SAEL will actively engage low-income groups (if any) in the project area to ensure their needs and perspectives are incorporated into the decision-making process. Recognizing these communities as key stakeholders is essential, as they may face unique challenges related to economic insecurity, access to resources, and participation in project benefits.
- **Vulnerable Populations:** SAEL recognizes that vulnerable individuals, including those dependent on grazing activities, sharecroppers, marginal farmers, unemployed or marginal workers, children, and the elderly, require special attention. Efforts will be made to engage these groups, ensuring their needs are considered and that they have access to project benefits.
- **Women Groups and Vulnerable Women:** Women members of the community are vital stakeholders in project decision-making. Historically, their voices have often been overlooked, leading to perceptions of neglect. SAEL will prioritize the inclusion of women in consultations and decision-making processes to ensure their perspectives and needs are addressed. Special emphasis will also be placed on engaging vulnerable women, who may face additional barriers due to gender norms and economic dependence. Initiatives will aim to empower all women, ensuring that their voices are heard and that their unique challenges are considered in project discussions.
- **Older People:** The elderly population, often reliant on community support and services, will be consulted to understand their specific needs and how the project may impact their livelihoods and well-being.
- **Disabled Individuals:** Efforts will be made to include people with disabilities in the engagement process. This will involve adapting communication methods and ensuring accessibility in consultations to gather their insights and address their needs.

⁶³ <https://www.sc.com/en/about/sustainability/position-statements/human-rights/#:~:text=All%20individuals%20are%20equally%20entitled,duty%20to%20protect%20such%20rights.>

- **Children:** As future stakeholders, children's interests and rights will be prioritized. SAEL will engage with families and community leaders to ensure that children's voices are considered and that their safety and well-being are upheld throughout the project.
- **Suppliers:** Local suppliers will also be identified as key stakeholders, as their involvement is crucial for project success. Engagement with suppliers will focus on fostering ethical practices, ensuring fair labor conditions, and promoting local economic benefits.
- **Project Investors:** SAEL will work closely with project investors to ensure that investment practices adhere to human rights standards. Regular reviews will be conducted to assess the impact of investment decisions on human rights and community well-being.

Task 2. Risk Identification

- **Land Procurement/Acquisition and Resettlement:** SAEL will assess risks related to land acquisition, compensation, and resettlement. The process will be transparent and fair, ensuring that affected individuals and communities are adequately compensated and resettled in accordance with their rights. Potential violation related to land procurement is providing lesser compensation to the women PAPs.
- **Labor Practices:** SAEL will evaluate risks associated with labor practices, including fair wages, working conditions, and non-discrimination. All employment practices and contractor agreements will comply with international labor standards. Involvement of child or forced labor during the construction phase by project itself or in the supply chain.
- **Solar Suppliers:** SAEL will assess risk related to its Solar Supply chain process under the Human Rights Impact Assessment (HRIA) as it's essential to identify potential risks that could affect human rights throughout the supply chain.
- **Environmental Impact:** Potential environmental impacts of the project, such as effects on local ecosystems, water resources, and air, noise, water quality, will be thoroughly assessed. SAEL will implement measures to mitigate these impacts and protect the health and livelihoods of local communities.

Task 3. Impact Assessment

- **Local Governance and Decision-Making:** SAEL will examine the project's effects on local governance structures and decision-making processes. The involvement of local administrative bodies will be ensured, with decisions reflecting the needs of all community members.
- **Community Health and Safety:** The impact on community health and safety will be assessed, including risks from project-related noise, air pollution, or accidents. SAEL will implement measures to mitigate these risks and safeguard community well-being.
- **Cultural and Social Impact:** SAEL will evaluate how the project affects local cultures and social structures. Efforts will be made to preserve cultural heritage and maintain community cohesion.

Task 4. Risk Management and Mitigation

- **Employment and Training Opportunities:** SAEL will develop strategies to ensure equal employment opportunities and training for both men and women, including marginalized groups. Job creation and fair wage distribution will be monitored to provide safe working conditions. SAEL will ensure that no child or forced labor will be involved in the project and in the supply chain.
- **Land and Resource Management:** Responsible management of land and resources will be a priority. SAEL will ensure that local communities are involved in decision-making processes and benefit from project activities. Bonafide beneficiary and legal heirs were involved in disbursing the compensation for the cases where children and elderly were involved.
- **Supply Chain Process:** SAEL will develop a robust code of conduct that includes human rights commitments, labor rights, and environmental standards and will require all suppliers to adhere to this

code, with clear consequences for violations. SAEL has a responsible sourcing policy which will be followed prior to sourcing of raw materials especially solar panels and related components.

- **Grievance Mechanisms:** Accessible grievance mechanisms will be established for stakeholders to report human rights concerns. SAEL will ensure that these mechanisms are effective, transparent, and provide timely resolutions.

Task 5. Monitoring and Reporting

- **Regular Monitoring:** This involves a systematic and continuous monitoring process designed to track the project's impact on human rights and ensure that mitigation measures are effectively addressing identified risks. Regular monitoring will involve surveys, interviews, and field observations, to capture the perspectives of affected communities and other stakeholders. SAEL will establish dedicated teams responsible for monitoring human rights impacts, ensuring that any issues are identified and addressed in a timely manner. The monitoring process will also include periodic reviews of project activities, compliance with human rights standards, and the effectiveness of mitigation strategies. This proactive approach aims to promptly detect any adverse effects, adapt mitigation measures as needed, and ensure that the project remains aligned with human rights principles throughout its duration.
- **Reporting:** To maintain transparency and build trust with stakeholders, SAEL will provide regular updates on human rights risk management and mitigation efforts. These updates will include detailed reports on the status of human rights impacts, the effectiveness of mitigation measures, and any corrective actions taken. SAEL will ensure that these reports are accessible to all relevant stakeholders, including local communities, opinion holders, SC and ST groups, and project investors. The reporting process will involve both formal documentation, such as annual or semi-annual reports, and informal updates, such as community meetings or newsletters. By openly sharing information about the project's human rights performance, SAEL will foster accountability, demonstrate commitment to human rights, and address any concerns or misconceptions that may arise. This transparency is crucial for maintaining stakeholder confidence and ensuring that the project's human rights impacts are managed effectively.
- **Stakeholder Feedback:** Incorporating feedback from stakeholders is a critical component of SAEL's human rights risk management strategy. SAEL will actively solicit input from affected communities, local leaders, and other relevant stakeholders through various channels, such as community forums, feedback mechanisms, and grievance redressal systems. This feedback will be used to assess the effectiveness of existing risk management strategies and identify areas for improvement. SAEL will establish formal mechanisms for collecting and analysing stakeholder feedback, ensuring that all voices are heard and considered. The feedback process will allow continuous adaptation of risk management strategies in response to changing circumstances. By integrating stakeholder perspectives into decision-making processes, SAEL aims to enhance the project's human rights performance, address emerging issues proactively, and ensure that the project's impacts are managed in a manner that is fair and equitable for all involved.

Task 6. Review and Continuous Improvement

- **Periodic Review:** SAEL will implement a robust system for the periodic review of the Human Rights Risk Assessment (HRRRA) framework to ensure that it remains effective and relevant throughout the life of the 300 MW solar project. This review process will be conducted at regular intervals—such as quarterly or biannually—depending on the project's scale and complexity. The periodic review will involve evaluating the framework against current human rights standards, regulatory requirements, and best practices to ensure compliance and effectiveness. During these reviews, SAEL will assess the performance of the HRRRA framework by analysing data collected from monitoring activities, stakeholder feedback, and incident reports. This assessment will focus on identifying any gaps or deficiencies in the framework and determining whether the current strategies adequately address the identified human rights risks. Additionally, the review process will consider evolving human rights norms and expectations, including emerging issues or new regulations that may impact the project.
- **Adaptive Management:** SAEL's commitment to adaptive management involves continuously refining and adjusting the HRRRA framework and associated risk management strategies based on real-time data,

monitoring results, and stakeholder feedback. Adaptive management is a dynamic process that allows SAEL to respond promptly to new risks or unforeseen issues that may arise during the project's implementation. When monitoring results or stakeholder feedback indicate that certain human rights risks are not being effectively mitigated or that new risks have emerged, SAEL will take proactive steps to update and enhance the framework. This may involve revising risk assessments, implementing additional mitigation measures, or introducing new policies and procedures. For example, if feedback reveals that a particular community is facing unforeseen challenges related to land acquisition, SAEL might adjust its engagement strategies or provide additional support to address these issues. The focus on continuous improvement ensures that the HRRRA framework remains responsive to the needs of stakeholders and the evolving human rights landscape. By embracing adaptive management, SAEL can effectively address emerging risks, optimize its human rights performance, and maintain a strong commitment to protecting and promoting human rights throughout the project's lifecycle.

3 Methodology

A customized impact assessment methodology was applied to this Human Rights Impact Assessment based on UNGP guidance which indicates that the significance of human rights impacts should be determined by considering the scale and scope (severity) and irremediability of the impact.

The precautionary principle was applied in assessing the potential impacts to salient human rights relevant to this Project.

The scale and vulnerability of the impact is based on a rights holder's particular circumstance, their ability to respond to change and the implication on the seriousness of the impact. This Project applied descriptors for impact scale and vulnerability as per **Error! Reference source not found.** below.

Qualitative Descriptors of Scale/Vulnerability

Scale/Vulnerability Impact Rating	Description
Low	Good ability to anticipate, cope with or resist project-related impacts, such that the impact may be less severe or less likely to become a human rights violation.
Medium	Some risk of being unable to anticipate, cope with, resist and recover from Project-related impacts to human rights resulting in a tangible infringement of rights and access to highly valued infrastructure/assets/ecosystem services.
High	High risk of being unable to anticipate, cope with, resist and recover from Project-related impacts to human rights, and/or high risk of experiencing human rights impacts more severely with potential implications on health, life, and longevity of life of rights holders.

Scope and intensity of the impact considers the extent of people affected (within the rights holder cohort), not just linked to numbers but also potential impacts that may be biased towards a subsection which may be proportionally more severely impacted. Table Below presents the rating descriptors for impact scope/intensity applied to this Project.

Qualitative Descriptors of Scope/Intensity

Scope/Intensity Impact Rating	Description
Minor	Isolated clusters of the local population are impacted without any differentiated impacts on a specific community group. Duration of the impact is temporary in nature.
Moderate	Less than 25% of the local population is impacted with minor or negligible set of differentiated impacts on a specific community group. Duration of the impact is short to medium term
Major	A significant part of the local population (at least 25%) is impacted with differentiated impacts on a specific community group. Duration of the impact is medium to long term

The severity of human rights impacts reflects the extent or degree of change caused by the impact. Impact severity classification (negligible, moderate, severe) is an amalgamation of scale and scope ratings, as per the table below.

Overall Impact Severity Classification

		Impact Scope/Intensity		
		Minor	Moderate	Major
Impact Scale/Vulnerability	Low	Negligible	Negligible	Moderate
	Medium	Negligible	Moderate	Severe
	High	Moderate	Moderate	Severe

Impact irremediability, the final parameter applied to determining significance of human rights impacts, assesses the potential to mitigate and/or remediate the effects associated with each impact. The process is based on obligations of the private and business sectors (and in this case, the Contractor, and the Subcontractor) pertaining to the respect of human rights, remediation measures for activities with direct accountability, and the provision of an accessible grievance mechanism.

Irremediability is considered difficult when impacts are unprecedented with complex technical requirements; various stakeholders are involved; the potential for acceptance of remediation by the identified group is limited; and when capacities to support implementation are limited, with no viable remedy for impact consequences.

4 Impact Description and Assessment Overview

Assessment of Human Rights Impacts

Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
Right of self-determination	The Project will affect access to land and resources, potentially affecting the ability of local populations to manage their means of subsistence. Vulnerable groups such as women, children, elderly and informal land users may neglected from benefiting from the project or from receipt of compensation.	<ul style="list-style-type: none"> • Livelihood Restoration Plan 				
Right to life	The Project could present a threat to life due to hazards arising from construction and operation for Project workers.	<ul style="list-style-type: none"> • OHS Plan • Worker Grievance Mechanism • Community Grievance Mechanism 				
Right not to be subjected to torture, cruel, inhuman and/or degrading treatment or punishment	There is a potential risk in relation to this right in relation to severe harassment of Project workers or community members by project employees (including security personnel), or dangerous working conditions that cause serious mental distress and anguish..	<ul style="list-style-type: none"> • Worker Code of Conduct • Security Management Plan • OHS Plan • Community Grievance Mechanism 				
Right not to be subjected to slavery, servitude or forced labour	Forced labour is a potential risk for projects in India and safeguards are required to prevent the Project using forced labour, either directly or unintentionally through subcontractors.	<ul style="list-style-type: none"> • HR Policy 				

Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
Rights to liberty and security of person	Although the Project will not detain or arrest any persons, there is a potential risk of the Project impacting the security of person (i.e., causing physical or mental injury), or security personnel creating threats or harassment.	<ul style="list-style-type: none"> • Worker Code of Conduct • Security Management Plan • OHS Plan • Community Grievance Mechanism 				
Right to privacy	Information that is held by the Project about Project workers, households that are impacted by the Project (particularly in relation to resettlement), and those that are involved in stakeholder engagement needs to be properly managed so as to prevent an impact on the right to privacy of those people.	<ul style="list-style-type: none"> • HR Policy • Worker / Community Grievance Mechanism • Resettlement Action Plan 				
Rights to freedom of thought, conscience, and religion	This right could be impacted in the context of discrimination against Project workers on religious grounds.	<ul style="list-style-type: none"> • HR Policy • Worker Grievance Mechanism 				
Rights to freedom of opinion and expression	This right could be impacted in the context of discrimination against Project workers on the basis of their opinions, or their right to express opinions could be unduly restricted for Project workers, Project affected persons or those involved in stakeholder engagement.	<ul style="list-style-type: none"> • HR Policy • Worker / Community Grievance Mechanisms • Stakeholder Engagement Plan 				

Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
Rights to freedom from war propaganda, and freedom from incitement to racial, religious, or national hatred	This right could be impacted for Project workers if their colleagues were not restricted from inciting racial, religious, or national hatred.	<ul style="list-style-type: none"> • HR Policy • Worker Grievance Mechanism 				
Right to freedom of assembly	This right could be impacted if the Project prevented Project workers or community members from assembling, such as through the actions of security personnel to prevent or break up such assembly.	<ul style="list-style-type: none"> • Worker / Community Grievance Mechanisms • Security Management Plan 				
Right to freedom of association and the right to form trade unions and join a trade union and the right to strike	This right could be impacted if the Project prevented Project workers from joining unions, or participating in collective bargaining.	<ul style="list-style-type: none"> • HR Policy • Worker Grievance Mechanism 				
Rights of protection of the family, the right to marry and the right to a family life	This right could be impacted if Project workers were prevented from having a healthy work/life balance that prevented them from enjoying time with their family, or if the Project did not provide adequate provision for parental leave.	<ul style="list-style-type: none"> • HR Policy • Worker Grievance Mechanism 				
Rights of protection for the child	The rights of children to be protected could be impacted by the Project through the use of child labour, or through sexual or other abuses of children in local communities through the actions of Project workers and security personnel.	<ul style="list-style-type: none"> • HR Policy • Worker Code of Conduct • Community Grievance Mechanism • Contractor Management Process 				

Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
Right to equality before the law, equal protection of the law, and rights of non-discrimination	This right would be impacted by the Project if there were any discriminatory practices or treatment of Project workers or affected people, including those impacted by the project.	<ul style="list-style-type: none"> • SCA/LRP • HR Policy 				
Right to work	<p>This right would be impacted if there were any cases of forced labour (within project or in the supply chain) or if there were discrimination in the recruitment process. It could also be impacted if Project employment opportunities were not available to those in local communities or were available based on unfair recruitment practices, i.e., favoritism towards certain groups.</p> <p>Vulnerable groups involved in informal use of land may lose the livelihood due to the project development</p>	<ul style="list-style-type: none"> • HR Policy • LRP • Worker / Community Grievance Mechanisms • Contractor and Supplier management. 				
Right to enjoy just and favorable conditions of work	This right would be impacted if workers were not given fair working conditions, including fair wages, safe and healthy working conditions, equal opportunity and reasonably rest, leisure holidays time.	<ul style="list-style-type: none"> • HR Policy • Worker / Community Grievance Mechanisms 				
Right to an adequate standard of living	This right would be impacted if the economic displacement from their land or structures used for livelihoods were not adequately mitigated.	<ul style="list-style-type: none"> • LRP 				

Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
Right to health	This right would be impacted if the Project created environmental pollution (emissions, discharges, or noise) that could affect human health, if it contributed to the spread of disease, or if it affected Project worker health due to unsafe or unhealth working practices.	<ul style="list-style-type: none"> • OHS Plan • Worker / Community Grievance Mechanisms • Management Plans: Air Quality and Dust; Traffic; Noise and Vibration; Waste; Hazardous Materials • Spill Response Plan 				
Rights to take part in cultural life and to benefit from scientific progress	Potential for the Project to impact sites of cultural importance that contribute to the rights of individuals and communities to pass on their unique values, customs, language, religion, and cultural references.	<ul style="list-style-type: none"> • Cultural Heritage Management • Procedure • Chance Find Procedure 				
Right of the Child and Human Rights Violations	The right of child and human rights maybe violated if the project may lead to violations of children's rights, particularly in the context of child labor and exploitation. Economic pressures may result in children being engaged in labor instead of attending school, hindering their development and perpetuating cycles of poverty.	<ul style="list-style-type: none"> • HR Policy • Worker Code of Conduct • Community Grievance Mechanism • Contractor Management Process 				
Right Against Forced Labor	The project may create conditions that facilitate forced labor, including coercion and exploitation of vulnerable populations. Economic pressures or lack of alternative employment opportunities may lead individuals to accept unfavorable	<ul style="list-style-type: none"> • HR Policy 				

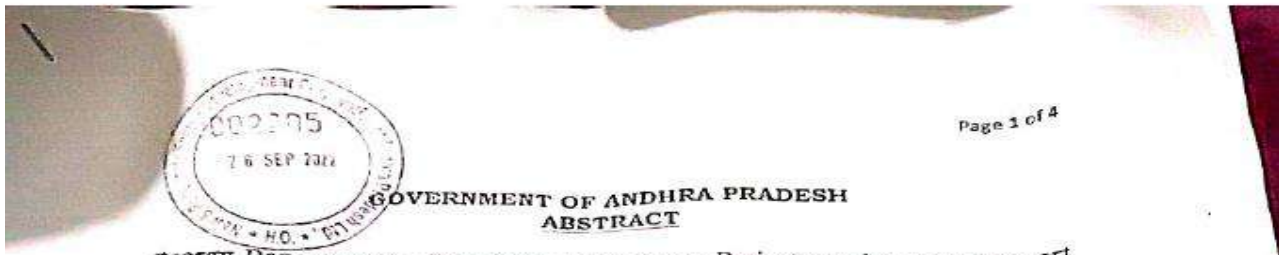
Human Rights	Description of Potential Impacts due to Project	Applicable Management or Monitoring Plans	Scale	Scope	Irremediability	Significance
	working conditions, undermining their autonomy and rights.					

The mitigation measures that will be assessed as being effective in minimising human rights risks, such that:

- The scale of risk is Low because the magnitude of the risks has been effectively reduced;
- The scope of the risk is Low, because the number of people who could be materially impacted has been effectively reduced; and
- The irremediability of the risk is Low as the GIIP and mitigation measures are generally measures that are well understood, often used and broadly acceptable to affected people.

The exception to the ratings of Low is in relation to the right to life, for which the scale was assessed as High. This reflects the consideration that the Project presents hazards that could be a threat to life, and that while the applicable OHS and CHSS measures will reduce the risk there is still the possibility of injury and fatality during construction and operation. However, the scale of this risk (i.e., number of people who could be impacted) is greatly reduced by the OHS and CHSS measures, and so the overall severity is assessed as Low. The anticipated effectiveness of the mitigation measures in managing the scale, scope and irremediability of the risks is reflected in the Low severity ratings for all assessed rights, and so no further measures are required in relation to human rights risks.

APPENDIX 13: GOVERNMENT OF AP NOTIFICATION FOR RENEWABLE PROJECTS



Page 1 of 4

GOVERNMENT OF ANDHRA PRADESH ABSTRACT

Energy Department - Promotion of RE Power Projects under AP RE Export Policy 2020 - Allotment of lands on lease basis - Revision of lease rentals payable to the private land owners @ Rs.30,000 per acre- Orders-Issued.

ENERGY (POWER-II) DEPARTMENT

G.O.Ms.No.20

Dated:13.09.2022

Read the following:-

1. AP Renewable Energy Export Policy notified vide G.O.Ms.No:20, dated:17.07.2020 of Energy (Power-II) Department.
2. Lr.No: NREDCAP/SE/APREEP 2020/2022, dated:05.08.2022 of Vice Chairman & Managing Director, NREDCAP

ORDER:-

In the reference 1st read above, the Government of AP have notified AP Renewable Energy Export Policy 2020 to promote Renewable Energy Power Projects for export of energy outside the AP State. Under this policy, it is proposed to aggregate the lands in wind/solar power potential areas and allocate them to the developers on long term lease basis (30 years) for setting up of RE Power Projects. The lease rentals are fixed @ Rs.31,000 per acre per annum with escalation of 5% for every two years period for both Government and Private lands. In respect of private lands an amount of Rs.25,000 will be paid to the land owner and Rs.6,000 will be remitted to the Government treasury. The lease rentals will be recurring revenue to the land owners as most of the lands identified are uncultivable barren lands.

2. In the reference 2nd read above, the VC & MD, NREDCAP has submitted proposal to Government to make certain amendments to the AP Renewable Energy Export Policy 2020 in order to provide more remuneration to the land owners who are providing lands on lease basis for promotion of renewable energy power projects. It was proposed for payment of lease rentals @ Rs.30,000 per acre per annum with escalation of 5% for every two years period to the Private land owners.

3. After detailed and careful examination of the proposal, Government have accepted the same since it would provide additional income to the land owners.

4. Accordingly, the following amendments are hereby made to the AP Renewable Energy Export Policy 2020 issued in G.O.Ms.No.20, Energy (Power-II) Department dated:17.07.2020, as detailed below:-

Point No. in the G.O.	Description	Existing provision	Amended as follows
8	(b) Remittance to Government	<p>1. Government Lands: The land aggregating agency shall remit the entire amount of lease rentals to the Government Treasury as Miscellaneous receipts.</p> <p>2. Private Lands: The land aggregating agency shall remit Rs.6,000/ acre/year with 5% escalation every 2 years to the Government treasury as Miscellaneous receipts.</p>	<p>1. Government Lands: The land aggregating agency shall remit the entire amount of lease rentals to the Government Treasury as Miscellaneous receipts.</p> <p>2. Private Lands: Rs.1000 per acre per annum will be credited into the consolidated fund of the State with 5% escalation every 2 years.</p>
9	b. Annual charges paid for private lands	<p>3) Land lease charges paid by land aggregating agency to private land owners: The land aggregating agency shall pay Rs.25,000 / acre/ year for the aggregated private lands from the date of taking possession till completion of lease period.</p> <p>• Escalation: 5% every 2 years</p>	<p>3) Land lease charges paid by land aggregating agency to private land owners: The land aggregating agency shall pay Rs.30,000 / acre/ year for the aggregated private lands from the date of taking possession till completion of lease period.</p> <p>• Escalation: 5% every 2 years</p>

	Additional Clause		Minimum capacity and land area: Under the Policy, the project developer shall establish a minimum of 500MW capacity project in a land aggregated to an extent of minimum 2000 acres at a single location in case of solar power projects. In respect of other category of RE projects, there is no restriction on capacity and land.

5. This order issues with the concurrence of Finance Department vide U.O.No. FINO1-FMUOASD(HE)/4/2020-FMU-HEIC (Computer No.1132369), dated:6-9-2022.

(BY ORDER AND IN THE NAME OF THE GOVERNOR OF ANDHRA PRADESH)

K.VIJAYANAND
SPECIAL CHIEF SECRETARY TO GOVERNMENT

To
 The Vice Chairman & Managing Director, NREDCAP, Tadepalli
 The Special Chief Secretary to Government, Revenue Department.
 The Chief Commissioner of Land Administration & Special Chief Secretary,
 APHC Towers, Mangalagiri.
 The Special Chief Secretary to Govt., Finance Department
 The Special Chief Secretary to Govt., Industries Department.
 All Collectors.

Copy to:

The Commissioner of Industries, Vijayawada.
 The Chairman & Managing Director, APTRANSCO, VidyuthSoudha,
 vijayawada.
 The Managing Director, APGENCO, VidyuthSoudha, Vijayawada.
 The Chairman & Managing Director, APSPDCL, Tirupathi.
 The Chairman & Managing Director, APCPDCL, Vijayawada.
 The Chairman & Managing Director, APEPDCL, Visakhapatnam.
 The P.S to Special Chief Secretary to Chief Minister.

APPENDIX 14: SAMPLE LEASE DEED AGREEMENT

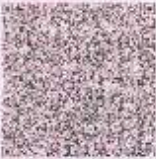
INDIA NON JUDICIAL
Government of Andhra Pradesh


e-Stamp

IN-AP93347977151268W

Certificate No.	IN-AP93347977151268W
Certificate Issued Date	12-Jun-2024 12:13 PM
Account Reference	CSCACC (GVY apcseg07/ AP-CDP/ AP-CDPSHA0167/apshaman0167u
DDO Code	120/2308001 SHO MUDDANUR
Unique Doc. Reference	SUBIN-APAPCSCEG0775024103986509W
Purchased by	SAEL SOLAR MHP1 PVT LTD
Description of Document	Article 31 Lease
Property Description	Not Applicable
Consideration Price (Rs.)	0 (Zero)
First Party	SAEL SOLAR MHP1 PVT LTD
Second Party	Not Applicable
Paid By (For Whom)	SAEL SOLAR MHP1 PVT LTD
Stamp Duty Amount (Rs.)	100 (One Hundred only)

CS NO 2856





LEASE DEED (లీజు ఒప్పందం)

BETWEEN (వీరి మధ్యన)

Chadula Rama Subba Reddy (Lessor)
చదుల రామ సుబ్బారెడ్డి (అస్సర్)

AND (మరియు)


SAEL Solar MHP1 Pvt Ltd (Lessee)
ఎస్ఎల్సోలార్ సోలార్ ఎమ్హెచ్ఎల్ఎల్ ప్రైవేట్ లిమిటెడ్ (అర్డెదారు)

DATED (తేదీ)

12th day of June, 2024 (12వ తేదీ జూన్ నెల 2024)

C. Rama Subba Reddy
(Lessor)

Pem Singh
(Lessee)



Security Alert:
The authenticity of this document (e-stamp) should be verified at www.apcseg.gov.in or using a Certified Mobile App that complies with the criteria on the Certificate and the application on the website. Please App security & audit.
2. The issue of checking the authenticity is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

2369
2024



Sheet Endorsement			Digitally Signed by: <input checked="" type="checkbox"/> Sheet No: 1
Book No: 1	CS No / Year: 2856 / 2024	Doct No / Year: 2369 / 2024	Name: R. ASI SUNEEL K.V. Location: MUDDANUR Reason: endorsement Sign Date: Thu Jun 13 17:57:17 I
SKIL		Sub-Registrar, MUDDANUR	

Presentation Endorsement

Presented in the Office of the Joint Sub-Registrar, MUDDANUR along with the Photographs & Thumb Impressions as required Under Section 32-A of Registration Act, 1908 and fee of Rs. 0/- paid between the hours of 5PM and 6PM on the 13th day of June, 2024

Execution admitted by (Details of all Executants/Claimants under Sec 32A):

Aadhar Details	FingerPrint	Sign
----------------	-------------	------

LE-1-1 Aadhaar No: XXXXXXXX9892

Name
Prem Singh [R] Sael Solar
Mhp1 Pvt Ltd, Guruharsahai,
Firozpur, Punjab

Relation
Sher Singh



Digitally Signed by:
Name: Prem Singh
Location: MUDDANUR
Reason: endorsement Sign
Date: Thu Jun 13 17:54:52 I

LR-999-1 Aadhaar No: XXXXXXXX8330

Name
Chadulla Ramasubba Reddy

Relation
Narasimha Reddy



Digitally Signed by:
Name: Chadulla Ramasubba
Location: MUDDANUR
Reason: endorsement Sign
Date: Thu Jun 13 17:54:14 I



Generated On: 13/06/2024 17:44:02



-2-

LEASE DEED

This lease deed ("Lease Deed") is made and executed on this 12th day of June, 2024, at Muddanuru village, and Mandal YSR Dist, Andhra Pradesh

లీజు ఒప్పందం

ఈ లీజు దస్తావేజు 2024వ సంవత్సరం జూన్ 12వ తేదీన ముద్దనూరు గ్రామం ముద్దనూరు మండలం వై యస్ ఆర్ జిల్లా ఆంధ్రప్రదేశ్ లో తయారు చేయబడింది మరియు అమలు చేయబడింది:

BY AND BETWEEN

Chadulla Ramasubba Reddy, C/O of C.Narasimha Reddy, aged about 72 years, residing at 4-10, T.Koduru, Kondapuram Mandal, Cuddapah District, Andhra Pradesh-516474, AADHAR No.: 3337 7696 8330 PAN No.--, Mobile: 7780338390 hereinafter referred to as the "Lessor" (which expression shall, unless repugnant to the context or meaning thereof, mean and include his/her/their legal heirs, successors and assigns) of the **FIRST PART**:

వీరి మధ్యన

చదుల రామసుబ్బారెడ్డి, C/O పి.నరసింహారెడ్డి, దాదాపు 72 సంవత్సరాల వయస్సు, 4-10, కోడూరు, కొండాపురం మండలం, కడప జిల్లా, ఆంధ్రప్రదేశ్-516474, ఆధార్ నంబర్: 3337 7696 8330 పాన్ నంబర్--ముద్ర: 7780338390, ఇకపై "లెస్సర్"గా సూచించబడుతుంది (ఈ వ్యక్తికరణ, దాని సంపర్కం లేదా దాని అర్థానికి వ్యతిరేకంగా ఉంటే తప్ప, అతని/ఆమె/వారి పట్ల పరమైన వారసులు, వారసులు మరియు అప్సైలను కలిగి ఉంటుంది) మొదటి భాగం;

AND

మరియు

SAEL Solar MHP Pvt Ltd, a company incorporated under the aegis of Companies Act, 2013, bearing CIN [U35105PB2023PTC58772] and having its registered office at Faridkot Road, Guruharsahai, Firozpur dist, Punjab-152022 through its authorized signatory, Mr. Prem Singh, age about 32 years (aadhar No 227878379892) (Mobile No. 8872363516) authorized vide board resolution dated 19.04.2024, hereinafter referred to as the "Lessee", (which expression shall unless repugnant to the context or meaning thereof mean and include its representatives and permitted assigns) of **SECOND**

PART

C. Ramasubba Reddy
(Lessor)

Prem Singh
(Lessee)





Sheet Endorsement Shr 2-54

Book No: **1** CS No / Year: **2856 / 2024** Doct No / Year: **2369 / 2024**

Digitally Signed by:
Name: **ASIS SUNEEL K.L.**
Location: **MUDDANUR**
Reason: **endorsementSign**
Date: **Thu Jun 13 17:37:17 I:**

Sub-Registrar, MUDDANUR

Identified by Witness

Aadhar Details	FingerPrint	Sign
<p>WT - 1 Aadhaar No: XXXXXXXX1775</p> <div style="display: flex; align-items: center;"><p>Name: Rajendra Prasad Nalukurthi</p></div> <p>Address: Flat No C-503 Quthbullapur, Medchal Dist Silver Springs Apartments K.v. Rangareddy</p>		<p>Digitally Signed by: Name: Rajendra Prasad Nal Location: MUDDANUR Reason: endorsementSign Date: Thu Jun 13 17:35:29 I:</p>
<p>WT - 1 Aadhaar No: XXXXXXXX1642</p> <div style="display: flex; align-items: center;"><p>Name: Katta Sai Sadgun</p></div> <p>Address: 3-135-2 gannevari palli gannevari palli Anantapur</p>		<p>Digitally Signed by: Name: Katta Sai Sadgun Location: MUDDANUR Reason: endorsementSign Date: Thu Jun 13 17:36:29 I:</p>

Date: 13/06/2024 17:44:02

Sub-Registrar, MUDDANUR
Name: **ASIS SUNEEL K.L.**
Location: **MUDDANUR**
Reason: **endorsementSign**
Date: **Thu Jun 13 17:37:17 I:**

Generated On: 13/06/2024 17:44:02

-3-

SAEL సోలార్ MHP1 Pvt Ltd, కంపనీల చట్టం, 2013 కింద పొందుపరచబడిన కంపెనీ, CIN [U35105PB2023PTC58772] ని కలిగి ఉంది మరియు దాని అధికారిక సంతకం శ్రీ ప్రేమ్ సింగ్ . వయస్సు సుమారు 32 సంవత్సరాలు (ఆధార్ నంబర్ 227878379892) (మొబైల్ నం. 8872363516) ద్వారా ఫిరదీ కోట్ రోడ్, గురుపూర్ణహాయ్, ఫిరోజ్ పూర్ జిల్లా, పంజాబ్-152002 వద్ద నమోదిత కార్యాలయాన్ని కలిగి ఉంది, దీని ద్వారా అధికారిక ప్రకటన బోర్డు తీర్మానం తేదీ 19.04.24, ఇకపై "అద్దెదారు"గా సూచిస్తారు.

The Lessor, the Confirming Party and the Lessee shall individually be referred to as a "Party" and together as the "Parties".

అద్దెదారు, నిర్ధారణనున్న పార్టీ మరియు లెస్సే వ్యక్తిగతంగా "పార్టీ"గా మరియు కలిపి "పార్టీలు"గా సూచిస్తారు.

RECITALS:

వర్ణనలు

- A. The Lessor is the absolute and exclusive owner having rights, title, interest and lawful, peaceful, vacant, unencumbered and physical possession, of the Land (as defined hereinafter) more particularly described under Schedule hereunder and delineated on a revenue map annexed hereto as Annexure I
అద్దెదారు హక్కులు, టైటిల్, ఆసక్తి మరియు చట్టబద్ధమైన, శాంతి యుతమైన, ఖాళీగా ఉన్న, భారం లేని మరియు బోతిక స్వాధీనాన్ని కలిగి ఉన్న సంపూర్ణ మరియు ప్రత్యేకమైన యజమాని (ఇక్కడ నిర్వచించినట్లుగా) మరియు ప్రత్యేకంగా క్రింద వివరించబడింది పెడ్యూల్ కింద మరియు ఇక్కడ జత చేయబడిన రెవెన్యూ మ్యాప్ అనికూర్చి.
- B. The Lessor has represented that no third-party has any subsisting right, title, interest, claim or concern of any nature on the Land and the Land is free from all kinds of Encumbrances.
భూమిపై సెంటిటిఫైడ్ హోల్డర్ హక్కు, టైటిల్, ఆసక్తి, దావా లేదా ఆందోళన ఏ తృతీయ పక్షానికే లేవని మరియు భూమి అన్ని రకాల బారాల నుండి విముక్తమని లెస్సే ప్రకారమే చెప్పారు.

(Lessor)

C. Rama Subbar Reddy





Sheet Endorsement

Digitally Signed by: **Sheet 3-5d**
 Name: **ASI SUNEEL KL**
 Location: **MUDDANUR**
 Reason: **endorsementSign**
 Date: **Thu Jun 13 17:57:17 R**

Book No: **1** CS No / Year: **2856 / 2024** Doct No / Year: **2369 / 2024**

Sub-Registrar, MUDDANUR

Cash Receipt Details In the Form of

	Online	Stamp Papers	Challan/14B/15/UCR	Cash	Stock Holding	Total
SD	116298	100	0	0	0	116398
TD		0				0
RF	1000	0	0	0	0	1000
UC	1100	0	0	0	0	1100
TOT	119398	100	0	0	0	119498

NOTE: TD:Transfer Duty, SD:Stamp Duty, RF:Registration Fee ,UC:=User Charges, TOT:Total, Desc:Description

Rs. 116298/- towards Stamp Duty including T.D under Section 41 of I.S. Act, 1899 and Rs. 1000/- towards Registration Fees on the chargeable value of Rs. 1371720/- was paid by the party through ONLINE No , 81120403632024, 81120414752024, 81120402992024 dated ,13-JUN-24,13-JUN-24,13-JUN-24

Date:

13th day of June, 2024

Digitally Signed by:
 Name: **ASI SUNEEL KL**
 Location: **MUDDANUR**
 Reason: **endorsementSign**
 Date: **Thu Jun 13 17:57:17 R**

Sub-Registrar, MUDDANUR

Digitally Signed by:
 Name: **ASI SUNEEL KL**
 Location: **MUDDANUR**
 Reason: **endorsementSign**
 Date: **Thu Jun 13 17:57:17 R**



Generated On:13/06/2024 17:44:02



-4-

- C. The Lessor has further represented to the Lessee that AdangalPahani and Form IB ROR for the year 2023, stands in the name of the Lessor, and is/are legally entitled to grant the Land on lease to the Lessee.

2023 సంవత్సరానికి అడంగల్ షహాణీ మరియు ఫారం 1బి ఆర్.ఓ.ఆర్., లెస్సర్స్‌కు మీద ఉన్నాయని, అద్దెదారుకు భూమిని లీజుపై ఇవ్వడానికి చట్టబద్ధంగా అర్హులని అద్దెదారుకు ప్రాతి నిర్ద్యం వహించారు.

- D. The Lessee is desirous of taking the Land for implementation of the Project (as defined hereinafter) thereon.

ప్రాజెక్ట్ (ఇకపై నిర్వచించినట్లు) అమలు కోసం భూమిని రీసుకేవాలని అద్దెదారు కోరుతున్నారు.

- E. The Lessee now, for its bonafide need and requirements, has approached the Lessors to lease the Land together with all rights, privileges, benefits, appurtenances, easements along with any and all rights attached thereto to the Lessee, free from all Encumbrances.

ఇప్పుడు అద్దెదారు, దాని సరసమైన అవసరం మరియు అవసరాలకోసం, అన్ని హక్కులు, అధికారాలు, ప్రయోజనాలు, అనుబంధాలు, సడలింపులతో పాటుగా లెస్సర్స్‌కి సంబంధించిన ఏదైనా మరియు అన్ని హక్కులతో పాటు, అన్ని భారాల నుండి విముక్తిగా భూమిని లీజుకు ఇవ్వడానికి అద్దెదారులను సంప్రదించారు.

- F. Based on the mutual representations, warranties, statements, assurances, indemnities, and covenants contained in this Lease Deed, the Lessor has agreed to transfer the leasehold rights in relation to the Land to the Lessee for the purpose of setting up and operating the Project (as defined hereinafter) on the terms and conditions set forth in this Lease Deed.

ఈ లీజు డీడ్‌లో ఉన్న పరస్పర ప్రాతినిధ్యాలు, వారంటీలు, స్టేట్‌మెంట్‌లు, హామీలు, నష్ట పరిహారాలు మరియు ఒడంబడికల ఆధారంగా, ప్రాజెక్ట్ ను ఏర్పాటు చేయడం మరియు నిర్వహించడం కోసం లెస్సర్స్‌కు భూమికి సంబంధించి లీజు హోల్డర్ కు హక్కులను బదిలీ చేయడానికి లెస్సర్స్‌జడిడ్‌లో ఏర్పాటు నిబంధనలు మరియు షరతులపై (ఇకపై నిర్వచించినట్లుగా) అంగీకరించారు.

(Lessor)

C. Ruma Subba Reddy

(Lessee)





Sheet 54

Steel Endorsement

Book No: 1 CS No / Year: 2856 / 2024 Doc No / Year: 2369 / 2024

Digitally Signed by:
Name: BONASI SUNEEL KU
Location: MUDDANUR
Reason: endorsement Sign
Date: Thu Jun 13 17:57:17 2024

Sub-Registrar, MUDDANUR

Certification of Registration

Registered as document no. 2369 of 2024 of Book-1 and assigned the identification number 1 - 1108 - 2369 - 2024 for Scanning on 13-JUN-24.

Digitally Signed by:
Name: BONASI SUNEEL KU
Location: MUDDANUR
Reason: endorsement Sign
Date: Thu Jun 13 17:57:17 2024

Sub-Registering Officer
MUDDANUR
BONASI SUNEEL KUMAR



Generated On: 13/06/2024 17:44:02



APPENDIX 15: CTUI INTIMATION LETTER FOR CONNECTIVITY



सेंट्रल ट्रांसमिशन यूलिटी ऑफ इंडिया लिमिटेड

(पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड के स्वामित्व में)
(भारत सरकार का उद्यम)

CENTRAL TRANSMISSION UTILITY OF INDIA LTD.
(A wholly owned subsidiary of Power Grid Corporation of India Limited)
(A Government of India Enterprise)

Ref No. CTU/S/5/Conn/INT-1 C-220000329

Date: 14.06.2024

Shri Pankaj Kumar
Authorized Signatory
SAEL Industries Limited
A-4, 2nd Floor, Green Park Main,
Sri Aurobindo Marg,
New Delhi-110016

Sub: Intimation for final grant of Connectivity for 300 MW to M/s SAEL Industries Ltd. at Kumool-III PS- Reg.

- Ref:**
1. Connectivity application, no. 220000329 (for 300 MW) dated 20.10.2023
 2. Intimation for in-principle grant of Connectivity, ref. no. CTU/S/5/Conn/INT-1A-220000329 dated 29.12.2023 for 300 MW.
 3. Submission of requisite Conn-BG1, Con-BG2 and Conn-BG3 as per in-principle grant of Connectivity

Dear Sir,

M/s SAEL Industries Ltd. was granted in-principle grant of connectivity for 300 MW against LoA contract capacity of 300 MW at Kumool-III PS. Further, for termination of its dedicated transmission line, 220kV line bay no. 208 was allocated at Kumool-III PS. However, due to change in layout arrangement, SLD of Kumool-III PS has been revised. Accordingly, bay no. allocated to M/s SAEL Industries Ltd. has changed from **208 to 207**.

In view of the above, please find attached intimation for final grant of Connectivity under GNA Regulations 2022 for 300 MW to M/s SAEL Industries Ltd. at Kumool-III PS.

You are requested to submit the Technical Connection Data within 30 days of issuance of this intimation and subsequently sign the Connectivity Agreement. You may contact at the following address for signing the agreement.

Sr. General Manager (BCD & Regulatory)

Central Transmission Utility of India Ltd
Saudamini, Plot No. - 2, Sector - 29,
Near IFFCO Chowk, Gurgaon - 122001
Tel: 0124-2823133

Thanking you

Yours faithfully,

(Anil Kr. Meena)
General Manager

Encl.: as above

संशोधित: प्रयाग नगर, प्लॉट नं. 2, सेक्टर-29, गुरुग्राम - 122001 (हरियाणा), कुम्होल-3 (आंध्र प्रदेश)। फोन: 0124-2823133। ईमेल: 0124-2823133@ctui.com।
"SAEL" (प्रा.) लि. 1st Floor, Plot No. 2, Sector-29, Gurgaon-122001, Haryana। टेल: 0124-2823133। ईमेल: 0124-2823133@ctui.com।
Website: <https://www.ctui.in>

APPENDIX 16: FLORAL DIVERSITY OF THE STUDY AREA

S.N.	Binomial Scientific Name	Family	Life form	IUCN Red List – Categories
1	<i>Abutilon indicum</i> (L.) Sweet	Malvaceae	Herb	Not assessed
2	<i>Acacia nilotica</i> (L.) Delile	Fabaceae	Tree	Least Concern
3	<i>Achyranthes aspera</i> L.	Amaranthaceae	Herb	Not assessed
4	<i>Agave americana</i> L.	Agavaceae	Herb	Least Concern
5	<i>Albizia lebbbeck</i> (L.) Benth.	Fabaceae	Tree	Least Concern
6	<i>Alternanthera sessilis</i> (L.) R.Br. ex DC.	Amaranthaceae	Herb	Least Concern
7	<i>Azadirachta indica</i> A.Juss.	Meliaceae	Tree	Least Concern
8	<i>Bambusa arundinacea</i> (Retz.) Willd.	Poaceae	Grass (Bamboo)	Not assessed
9	<i>Borassus flabellifer</i> L.	Arecaceae	Tree	Not assessed
10	<i>Calotropis gigantea</i> (L.) Dryand.	Apocynaceae	Tree	Not assessed
11	<i>Calotropis procera</i> (Aiton) Dryand.	Apocynaceae	Shrub	Least Concern
12	<i>Carissa carandas</i> L.	Apocynaceae	Shrub	Not assessed
13	<i>Cassia fistula</i> L.	Fabaceae	Tree	Least Concern
14	<i>Cocos nucifera</i> L.	Arecaceae	Tree	Not assessed
15	<i>Coldenia procumbens</i> L.	Boraginaceae	Herb	Least Concern
16	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae	Herb	Not assessed
17	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae	Grass	Not assessed
18	<i>Datura innoxia</i> Mill.	Solanaceae	Herb	Not assessed
19	<i>Delonix regia</i> (Hook.) Raf.	Fabaceae	Tree	Least Concern
20	<i>Dichanthium annulatum</i> (Forssk.) Stapf	Poaceae	Grass	Not assessed
21	<i>Eucalyptus</i> sp.	Myrtaceae	Tree	
22	<i>Euphorbia antiquorum</i> L.	Euphorbiaceae	Tree	Least Concern
23	<i>Euphorbia caducifolia</i> Haines	Euphorbiaceae	Tree	Not assessed
24	<i>Euphorbia hirta</i> L.	Euphorbiaceae	Herb	Not assessed
25	<i>Ficus benghalensis</i> L.	Moraceae	Tree	Not assessed
26	<i>Ficus religiosa</i> L.	Moraceae	Tree	Least Concern
27	<i>Ficus virens</i> Aiton	Moraceae	Tree	Least Concern
28	<i>Glinus oppositifolius</i> (L.) Aug.DC.	Molluginaceae	Herb	Least Concern
29	<i>Grewia asiatica</i> L.	Malvaceae	Tree	Least Concern
30	<i>Hardwickia binate</i> Roxb.	Fabaceae	Tree	Least Concern
31	<i>Heliotropium ovalifolium</i> Forssk.	Boraginaceae	Herb	Least Concern
32	<i>Heteropogon contortus</i> (L.) P.Beauv. ex Roem. & Schult.	Poaceae	Grass	Not assessed

S.N.	Binomial Scientific Name	Family	Life form	IUCN Red List – Categories
33	<i>Ipomoea carnea</i> Jacq.	Convolvulaceae	Shrub	Not assessed
34	<i>Jatropha glandulifera</i> Roxb.	Euphorbiaceae	Shrub	Not assessed
35	<i>Lantana camara</i> L.	Verbenaceae	Shrub	Not assessed
36	<i>Mangifera indica</i> L.	Anacardiaceae	Tree	Data Deficient
37	<i>Mimosa rubicaulis</i> Lam.	Fabaceae	Shrub	Not assessed
38	<i>Opuntia stricta</i> (Haw.) Haw.	Cactaceae	Shrub	Least Concern
39	<i>Parkinsonia aculeata</i> L.	Fabaceae	Tree	Least Concern
40	<i>Passiflora foetida</i> L.	Passifloraceae	Climber	Not assessed
41	<i>Peltophorum pterocarpum</i> (DC.) K.Heyne	Fabaceae	Tree	Not assessed
42	<i>Phoenix sylvestris</i> (L.) Roxb.	Arecaceae	Tree	Not assessed
43	<i>Pongamia pinnata</i> (L.) Pierre	Fabaceae	Tree	Least Concern
44	<i>Prosopis cineraria</i> (L.) Druce	Fabaceae	Tree	Not assessed
45	<i>Prosopis juliflora</i> (Sw.) DC.	Fabaceae	Tree	Not assessed
46	<i>Ricinus communis</i> L.	Euphorbiaceae	Small Tree	Not assessed
47	<i>Senna alexandrina</i> Mill.	Fabaceae	Herb	Least Concern
48	<i>Senna auriculata</i> (L.) Roxb.	Fabaceae	Shrub	Not assessed
49	<i>Senna italica</i> Mill.	Fabaceae	Herb	Not assessed
50	<i>Sida acuta</i> Burm.f.	Malvaceae	Herb	Not assessed
51	<i>Solanum pubescens</i> Willd.	Solanaceae	Shrub	Not assessed
52	<i>Solanum virginianum</i> L.	Solanaceae	Herb	Not assessed
53	<i>Syzygium cumini</i> (L.) Skeels	Myrtaceae	Tree	Least Concern
54	<i>Tamarindus indica</i> L.	Fabaceae	Tree	Least Concern
55	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae	Herb	Not assessed
56	<i>Tribulus terrestris</i> L.	Zygophyllaceae	Herb	Least Concern
57	<i>Tridax procumbens</i> (L.) L.	Asteraceae	Herb	Not assessed
58	<i>Typha domingensis</i> Pers.	Typhaceae	Herb	Least Concern
59	<i>Ziziphus mauritiana</i> Lamk.	Rhamnaceae	Tree	Least Concern

Source: Primary site survey

APPENDIX 17: HERPETOFAUNA DIVERSITY FROM THE STUDY AREA

S.N.	Common English Name	Binomial Scientific Name	IUCN Red List – Categories	Wildlife (Protection) Act – Schedules	Reported / Observed
1	Oriental Garden Lizard	<i>Calotes versicolor</i>	Least Concern	Not listed	Observed
2	Common Krait	<i>Bungarus caeruleus</i>	Least Concern	Schedule IV	Reported
3	Common Skittering Frog	<i>Euphlyctis cyanophlyctis</i>	Least Concern	Schedule II	Observed
4	Golden Skink	<i>Eutropis carinata</i>	Least Concern	Not listed	Observed
5	Indian Bullfrog	<i>Hoplobatrachus tigerinus</i>	Least Concern	Schedule II	Observed
6	South Indian Rock Agama	<i>Psammophilus dorsalis</i>	Least Concern	Not listed	Observed
7	Asian Common Toad	<i>Duttaphrynus melanostictus</i>	Least Concern	Not listed	Reported
8	Jerdon's Bullfrog	<i>Hoplobatrachus crassus</i>	Least Concern	Schedule IV	Reported
9	Common Indian Cricket Frog	<i>Minervarya agricola</i>	Least Concern	Not listed	Reported
10	Chunam Tree Frog	<i>Polypedates maculatus</i>	Least Concern	Not listed	Reported
11	Leschenault's Gecko	<i>Hemidactylus leschenaultii</i>	Least Concern	Not listed	Reported
12	Bengal Monitor Lizard	<i>Varanus bengalensis</i>	Near Threatened	Schedule I	Observed
13	Indian Rock Python	<i>Python molurus</i>	Near Threatened	Schedule I	Reported
14	Indian Cobra	<i>Naja naja</i>	Least Concern	Schedule I	Reported
15	Russell's Viper	<i>Daboia russelii</i>	Least Concern	Schedule I	Reported
16	Oriental Ratsnake	<i>Ptyas mucosa</i>	Least Concern	Schedule I	Reported
17	Banded Racer	<i>Platyceps plinii</i>	Not assessed	Not listed	Reported
18	Red Sand Boa	<i>Eryx johnii</i>	Near Threatened	Schedule I	Reported

Source: Primary site survey; Forest Working Plan of Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division; <https://www.inaturalist.org>

APPENDIX 18: AVIFAUNAL DIVERSITY FROM THE STUDY AREA

S.N.	Common English Name	Binomial Scientific Name	Migrant (M) / Resident I	IUCN Red List – Categories	Wildlife (Protection) Act. 1972 – Schedules
1	Ashy Prinia	<i>Prinia socialis</i>	R	Least Concern	Schedule IV
2	Ashy-crowned Sparrow-lark	<i>Eremopterix griseus</i>	R	Least Concern	Schedule IV
3	Asian Green Bee-eater	<i>Merops orientalis</i>	R	Least Concern	Schedule IV
4	Asian Koel	<i>Eudynamys scolopaceus</i>	R	Least Concern	Schedule IV
5	Asian Openbill	<i>Anastomus oscitans</i>	R	Least Concern	Schedule IV
6	Asian Palm-swift	<i>Cypsiurus balasiensis</i>	R	Least Concern	Schedule IV
7	Baya Weaver	<i>Ploceus philippinus</i>	R	Least Concern	Schedule IV
8	Bay-backed Shrike	<i>Lanius vittatus</i>	R	Least Concern	Not Listed
9	Black Drongo	<i>Dicrurus macrocercus</i>	R	Least Concern	Schedule IV
10	Black-headed Ibis	<i>Threskiornis melanocephalus</i>	R	Near Threatened	Schedule IV
11	Black-rumped Flameback	<i>Dinopium benghalense</i>	R	Least Concern	Schedule IV
12	Black-winged Kite	<i>Elanus caeruleus</i>	R	Least Concern	Schedule II
13	Black-winged Stilt	<i>Himantopus himantopus</i>	R	Least Concern	Schedule IV
14	Brahminy Starling	<i>Sturnia pagodarum</i>	R	Least Concern	Schedule IV
15	Bronze-winged Jacana	<i>Metopidius indicus</i>	R	Least Concern	Schedule IV
16	Cattle Egret	<i>Bubulcus ibis</i>	R	Least Concern	Schedule IV
17	Common Coot	<i>Fulica atra</i>	R	Least Concern	Schedule IV
18	Common Hoopoe	<i>Upupa epops</i>	R	Least Concern	Not Listed
19	Common Myna	<i>Acridotheres tristis</i>	R	Least Concern	Schedule IV
20	Coppersmith Barbet	<i>Psilopogon haemacephalus</i>	R	Least Concern	Schedule IV
21	Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	R	Least Concern	Schedule IV
22	Eurasian Spoonbill	<i>Platalea leucorodia</i>	R	Least Concern	Schedule I
23	Great Cormorant	<i>Phalacrocorax carbo</i>	R	Least Concern	Schedule IV
24	Great Egret	<i>Ardea alba</i>	R	Least Concern	Schedule IV
25	Greater Coucal	<i>Centropus sinensis</i>	R	Least Concern	Schedule IV
26	Grey Francolin	<i>Francolinus pondicerianus</i>	R	Least Concern	Schedule IV
27	Grey Heron	<i>Ardea cinerea</i>	R	Least Concern	Schedule IV
28	House Crow	<i>Corvus splendens</i>	R	Least Concern	Schedule V
29	House Sparrow	<i>Passer domesticus</i>	R	Least Concern	Schedule IV
30	Indian Cormorant	<i>Phalacrocorax fuscicollis</i>	R	Least Concern	Schedule IV
31	Indian Peafowl	<i>Pavo cristatus</i>	R	Least Concern	Schedule I
32	Indian Pond Heron	<i>Ardeola grayii</i>	R	Least Concern	Schedule IV
33	Indian Robin	<i>Saxicoloides fulicata</i>	R	Least Concern	Schedule IV
34	Indian Silverbill	<i>Euodice malabarica</i>	R	Least Concern	Schedule IV
35	Indian Spot-billed Duck	<i>Anas poecilorhyncha</i>	R	Least Concern	Schedule IV
36	Intermediate Egret	<i>Ardea intermedia</i>	R	Least Concern	Schedule IV
37	Jacobin Cuckoo	<i>Clamator jacobinus</i>	R	Least Concern	Schedule IV

S.N.	Common English Name	Binomial Scientific Name	Migrant (M) / Resident I	IUCN Red List – Categories	Wildlife (Protection) Act. 1972 – Schedules
38	Jungle Prinia	<i>Prinia sylvatica</i>	R	Least Concern	Schedule IV
39	Large Grey Babbler	<i>Argya malcolmi</i>	R	Least Concern	Schedule IV
40	Large-billed Crow	<i>Corvus macrorhynchos</i>	R	Least Concern	Schedule IV
41	Laughing Dove	<i>Streptopelia senegalensis</i>	R	Least Concern	Schedule IV
42	Lesser Whistling-duck	<i>Dendrocygna javanica</i>	R	Least Concern	Schedule IV
43	Little Cormorant	<i>Microcarbo niger</i>	R	Least Concern	Schedule IV
44	Little Egret	<i>Egretta garzetta</i>	R	Least Concern	Schedule IV
45	Little Grebe	<i>Tachybaptus ruficollis</i>	R	Least Concern	Schedule IV
46	Little Ringed Plover	<i>Charadrius dubius</i>	R	Least Concern	Schedule IV
47	Long-tailed Shrike	<i>Lanius schach</i>	R	Least Concern	Not Listed
48	Oriental Darter	<i>Anhinga melanogaster</i>	R	Near Threatened	Schedule IV
49	Oriental Magpie-Robin	<i>Copsychus saularis</i>	R	Least Concern	Schedule IV
50	Paddyfield Pipit	<i>Anthus rufulus</i>	R	Least Concern	Schedule IV
51	Painted Stork	<i>Mycteria leucocephala</i>	R	Least Concern	Schedule II
52	Pied Kingfisher	<i>Ceryle rudis</i>	R	Least Concern	Schedule IV
53	Purple Heron	<i>Ardea purpurea</i>	R	Least Concern	Schedule IV
54	Purple Sunbird	<i>Nectarinia asiatica</i>	R	Least Concern	Schedule IV
55	Red-naped Ibis	<i>Pseudibis papillosa</i>	R	Least Concern	Schedule IV
56	Red-vented Bulbul	<i>Pycnonotus cafer</i>	R	Least Concern	Schedule IV
57	Red-wattled Lapwing	<i>Vanellus indicus</i>	R	Least Concern	Schedule IV
58	River Tern	<i>Sterna aurantia</i>	R	Vulnerable	Schedule IV
59	Rock Dove	<i>Columba livia</i>	R	Least Concern	Schedule IV
60	Rose-ringed Parakeet	<i>Psittacula krameri</i>	R	Least Concern	Schedule IV
61	Rufous-tailed Lark	<i>Ammomanes phoenicura</i>	R	Least Concern	Schedule IV
62	Shikra	<i>Accipiter badius</i>	R	Least Concern	Schedule I
63	Streak-throated Swallow	<i>Petrochelidon fluvicola</i>	R	Least Concern	Schedule IV
64	White-breasted Kingfisher	<i>Halcyon smyrnensis</i>	R	Least Concern	Schedule IV
65	White-browed Wagtail	<i>Motacilla maderaspatensis</i>	R	Least Concern	Schedule IV
66	Zitting Cisticola	<i>Cisticola juncidis</i>	R	Least Concern	Schedule IV

Source: Primary site survey

APPENDIX 19: MAMMALS FROM THE STUDY AREA

S.N.	Common English Name	Binomial Scientific Name	IUCN Red List – Categories	Wildlife (Protection) Act. 1972 – Schedules	Reported / Observed
1	Bengal Fox	<i>Vulpes bengalensis</i>	Least Concern	Schedule I	Observed
2	Blackbuck	<i>Antelope cervicapra</i>	Least Concern	Schedule I	Reported
3	Bonnet Macaque	<i>Macaca radiata</i>	Vulnerable	Schedule II	Observed
4	Common Palm Squirrel	<i>Funambulus palmarum</i>	Least Concern	Schedule IV	Observed
5	Golden Jackal	<i>Canis aureus</i>	Least Concern	Schedule I	Reported
6	Indian Crested Porcupine	<i>Hystrix indica</i>	Least Concern	Schedule I	Reported
7	Indian Flying Fox	<i>Pteropus giganteus</i>	Least Concern	Schedule II	Observed
8	Indian Grey Mongoose	<i>Herpestes edwardsii</i>	Least Concern	Schedule II	Observed
9	Indian Hare	<i>Lepus nigricollis</i>	Least Concern	Schedule II	Observed
10	Indian Wolf	<i>Canis lupus pallipes</i>	Least Concern	Schedule I	Reported
11	Jungle Cat	<i>Felis chaus</i>	Least Concern	Schedule I	Reported
12	Least Pipistrelle	<i>Pipistrellus tenuis</i>	Least Concern	Not listed	Reported
13	Schneider’s Roundleaf Bat	<i>Hipposideros speoris</i>	Least Concern	Not listed	Reported
14	Tufted Grey Langur	<i>Semnopithecus priam</i>	Near Threatened	Schedule II	Reported
15	Wild Boar	<i>Sus scrofa</i>	Least Concern	Schedule II	Observed

Source: Primary site survey; Forest Working Plan of Kurnool, & Ananthapuramu Forest Divisions; and Proddatur Wildlife Division; <https://www.inaturalist.org>