Environmental and Social Impact Assessment of Proposed 65 MW Minpur Solar Power Project in Medak District, Telangana

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ARCADIS Design & Consultancy for natural and built assets

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

65 MW Solar Power Project in Medak District, Telangana

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LIST OF ABBREVIATIONS

AC	Alternating Current
ADB	Asian Development Bank
CGWB	Central Ground Water Board
CSR	Corporate Social Responsibility
CTE	Consent to Establish
CTO	Consent to Operate
DC	Direct Current
E&S	Environmental and Social Risk
EIA	Environment Impact Assessment
EP	Equator Principle
EPFI	Equator Principles Financial Institutions
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental Social Management Plan
FI	Financial Institutions
GAD	Gender And Development
GIIP	Good International Industry Practices
GRM	Grievance Redressal mechanism
IFC	International Finance Corporation
IFC PS	International Finance Corporation Performance Standards
PAP	Project Affected People
PCU	Power Conditioning unit
PV	Photovoltaic
PWD	Public Works Department
SMU	String Monitoring Units
SSA STD	Sarva Shiksha Abhiyan Standard
SHG	Self Help Groups
PPA	Power Purchase Agreement

EXECUTIVE SUMMARY

Background	ReNew Solar Energy Pvt. Ltd. (A SPV of ReNew Power) is planning to develop a 65 MW (AC) solar PV power plant at. The power purchase agreement has been signed with the DISCOM which is Southern Power Distribution Company of Telangana Ltd. Though renewable energy asset has limited environment impace pusruat to which they are exempted from seeking environment clearance as per host country regulation, ReNew undertakes third party Environment and Social impact assessment as per it's ESMS to identify the slightest environment / social concern their project activit is expected to generat and propose mitigation for the same. **ARCADIS India** has been appointed by ReNew Power, as an independent environment consultant to undertake the ESIA study. In past 5 years Arcadis has undertaken similar studies to over 2000 MW solar power asset across India. The ESIA was conducted to assess any potential impacts (both negative and positive) that may arise from the construction, operation and decommissioning of the proposed solar plant. The goal of the ESIA is to enhance sustainability of vital ecosystem, to improve or restore ecosystem health and biodiversity. Environmental sustainability in relation to the proposed solar power generation project will be enhanced by designing the solar power plant that gives competitive advantage over existing energy sources. The overall benefits of the proposed solar power system are expected to outweigh the potential negative impacts (if any). The Environmental and Social Impact Assessment (ESIA) study for the project has been undertaken in accordance with terms of reference approved by ADB for this project, International Finance Corporation's (IFC) Performance Standards (PS) on Social and Environmental Sustainability, 2012; Environment, Health and Safety Guidelines, Equator Principles; Relevant ILO conventions covering labour standards. The study will also assess the sustainability of the project w.r.t the local and national regulations relevant to the project.
Project Overview	The project is spread over three sites of 120, 200 and 125 acres (located in Yelakurthy, Korampally and Salojipally respectively). The sites will be connected using a 33 KV overhead line. The generated electricity will be evacuated to the 132 KV utility substation located at Minpur Village. The length of transmission line between power plant and utility substation is expected to be approximately 10-12 km. Village road is being used to access the project site. All the three project sites are located close to the village road. Access road will be created connecting the village road and the project site. This village road will be used by project proponent for the mobilization of manpower and machinery during the construction. The sites lie close to drainage channel and may impacte drainage pattern in the area if adequate measures are not taken. None of the project site is falls in the scheduled Areas as per Scheduled Areas in Andhra Pradesh (Including Telgana), Ministry of Tribal Affairs.
Applicable ADB policy	ADB's safeguard policy framework consists of three Operational policies on the environment, Indigenous Peoples and Involuntary Resettlement. Since land is purchased on willing seller willing buyer basis IR is not applicable Other policies viz ADB Policy on Gender and Development (GAD) , ADB's Social Protection Strategy (2001), ADB policy on Public Communication policy , ADB policies on participation guides are applicable to project activity ADB policies on 2010 on Gender mainstreaming guidelines is not applicable since the project would constitute of very short term construction period and limited manpower requirement during operation. The project influence is limited within project boundary and there is limited or no opportunity of gender mainstreaming by the project activity
Environmental Safeguards	The project will have environmental impacts due to generation of onsite noise, domestic wastes from site office and rest rooms, and generation of hazardous wastes from the construction site. The sites lie close to drainage channel and may impacte drainage pattern in the area if adequate measures are not taken. ReNew needs to follow its corporate level Environmental and Social Management System (ESMS) to manage the risks associated with its operations. This ESIA report includes evaluation of project specific environment and social risks arising from the project activities along with recommended mitigation measures. ReNew should also appoint a qualified E&S personnel with appropriate responsibility to implement/ oversee/ monitor the following:

	During Construction a) Performance of contractors on labour and health & safety aspects *During Operation* a) Periodic monitoring of environmental performance b) Internal and third party audit c) Management review *Both during Construction and Operation* a) The implementation of the ESMP b) Regular training of employees and contractors c) Emergency preparedness and response Periodic reporting of E&S performance to the management Hence the policy is applicable
ADB Policy on Gender and Development (GAD)	*During Construction* The project involves worker during construction. Employment of women workforce should be encouraged and equal employment opportunity should be provided. There should be no distinction in salary and compensation level. Facilities like separate toilets and crèche should be provided. Hence the policy is applicable
ADB's Social Protection Strategy (2001)	*During construction* Local as well as migrant labours would be involved in civil construction and erection of solar panels. Along with labours technical staff would be involved. Labour camps would be constructed and accommodation both on site and off site would be provided. There would be a mix of male and female workers at site. Families of workers may also be provided accommodation *During operation* Labours and workers would be involved in O&M and security. Site office would be constructed. Hence the policy is applicable
ADB policy on Public Communication policy	*During construction* Land procurement needs to be clearly communicated. There may be grievance in land procurement, vehicle movement and construction process. Such grievance needs to be promptly addressed *During Operation* Grievance related to project functioning, staff behaviour, restriction of access needs to be noted and acted upon. Proper escalation and communication channels needs to be established. Hence the policy is applicable to the project activity
ADB policies on participation guides	*During construction* The project involves restricting access due to construction of boundary walls across large tract of land, provision for designing and providing alternate access needs to be formulated based on participatory approach Drainage of the area would be affected in the event of alteration of topography, the impact and mitigation measures needs to be formulated on participatory basis Use of common property resources including but not limited to village roads, water , labour needs to be ascertained through consultation with opinion leaders of project affected village. *During operation*

	Any ongoing discomfort to local stakeholders due to access restriction and improper drainage management needs to be resolved through consultation and formulation of mitigation action by public consensus Hence the policy is applicable to project activity.
Applicable IFC's Performance Standards	The Environment and Social Management Plan (ESMP) for the project has been designed considering the requirement and framework of Indian environmental legislation, IFC's Performance Standards, Equator Principles and IFC's Industry Specific EHS guidelines. The following IFC's performance standards are applicable for this project: PS1: Social and Environmental Assessment and Management Systems, PS2: Labour and Working Conditions, PS3: Resource Efficiency & Pollution Prevention, PS 4: Community Health, Safety and Security and PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources. Also, IFC's core labour standards are applicable to the project. The project purchases land from voluntary sellers hence PS5: Land Acquisition and Involuntary Resettlement in not applicable and since the project does not fall in the Scheduled Area and project affected villages does not have any scheduled tribe population and hence PS7: Indigenous Peoples is not applicable. The project site and the study area does not have any cultural resource of significance and the possibility of chance find is negligible hence PS8: Cultural Heritage are not applicable for this project.
PS1: Social and Environmental Assessment and Management Systems	The project will have environmental and social impacts due to generation of onsite noise, domestic wastes from site office and rest rooms, and generation of hazardous wastes from the construction site. ReNew needs to follow its corporate level Environmental and Social Management System (ESMS) to manage the risks associated with its operations. This ESIA report includes evaluation of project specific environment and social risks arising from the project activities along with recommended mitigation measures. ReNew should also appoint a qualified E&S personnel with appropriate responsibility to implement/ oversee/ monitor the following: *Construction Phase* b) Performance of contractors on labour and health & safety aspects *Operation Phase* d) Periodic monitoring of social and environmental performance e) Internal and third party audit f) Management review *Both for Construction and Operation Phase* d) The implementation of the ESMP e) Community engagement and grievance redressal system/mechanism f) Regular training of employees and contractors g) Emergency preparedness and response h) Periodic reporting of E&S performance to the management Hence PS1 is applicable.
PS2: Labour and Working Conditions	The project will involve labour for civil construction and erection *During construction phase* Local as well as migrant labours would be involved in civil construction and erection of solar panels. Along with labours technical staff would be involved. Labour camps would be constructed and accommodation both on site and off site would be provided. There would be a mix of male and female workers at site. Families of workers may also be provided accommodation *During operation phase* Labours and workers would be involved in O&M and security. Site office would be constructed.

	Hence the PS 2 is applicable.
PS3: Resource Efficiency & Pollution Prevention	The project involves use of resources like land and water. Improper handling of broken and damage solar panel may result in soil contamination. Improper handling of spent oil may lead to contamination of soil and ground water. *During construction* The sites lie close to drainage channel and may impacte drainage pattern in the area if adequate measures are not taken.The project is constructed in agricultural land and hence impact on resource ie land is envisaged. Top soil management is required. Construction activities may lead to air and noise emission which needs to be managed. Broken / damaged solar panels may result in contamination of soil and ground water. Change in drainage pattern may impact ground water recharge / flooding. The project would involve clearing of vegetation / tree cutting. Construction and demolition waste along with waste water from labour camp and solid waste needs to be managed properly. Water will be used in construction and at labour camp *During operation* The project would use water for cleaning of module, none of the site is located in water scare region. Improper handling of Broken / damaged solar panels may result in contamination of soil and ground water. Diesel / transformer oil / spent oil may contaminate soil and water. Hence PS3 is applicable
PS4: Community Health, Safety and Security	Communities would be effected due to project activity *During construction* The project envisages influx of labours from nearby villages and migrant labours, who will be accommodated in the labour camp. These labour is expected to interact with community. Heavy vehicles carrying solar pannesl and equipment would use village roads to access site. Health and safety concern of worker needs to be addressed. Proper barricading of safety practices at construction site would impact exposure of community to site related risk. Common property may be utilised during construction phase. Access may be restricted / rerouted. *During operation* The project will generate electrical energy and transmitting the same through High voltage power line, thereby exposing the community to electrical injury. Construction of boundary wall may result in restriction of access / increased distances from common property. Interaction of community with project staff especially security staff would occur. Improper handling of hazardous waste including but not limited to broken / damaged solar panel may contaminate land and water with heavy metal (including but not limited to cadmium) thus impacting the community. Change in land use patter from agricultural to industrial will have impact on community along with frequent visits of people from outside the community with different cultural background. Thus PS 4 is applicable,
PS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The project uses large amount of land and associated natural capital is impacted. *During construction* Vegetation clearance is required for setting up solar panel. The removal of trees and vegetation would impact nesting ground of birds and burrowing animals *During operation* Project site would be cordoned off using a boundary wall thus impacting animal corridor if exists. Power would be transmitted using high voltage transmission line (10-12 km in length) thus risk of electrocution to fauna. Thus PS 6 is applicable to project activity
Key Project Impacts –	*Impact on drainage*: Manmade and natural reservoir is located very close to the project. Natural drain is passing through the Salojipally site and manmade canal is being constructed adjacent

Construction Phase	to the boundary of Yelakurthy site. Substantial alteration in topography would result is impacting local water balance and flodding of the nearby areas. *Access restriction:* Since project involves constructing boundary wall to large parcel of land the community may face access restriction. *Impact on air quality:* because of generation of fugitive dust due to movement of project vehicles and emission from diesel generators. In impact will be limited to the construction phase only. *Water resources*: Water for construction phase will be sourced after getting required approval from the concerned authority. As per CGWB categorization w.r.t to the groundwater development, the project site falls under **"Safe"** category. Hence, impact on the ground water is anticipated to be Low, based on the water requirement and duration of construction phase. *Conflict between migrant and local community*: Due to the large number of workers involved in the project activities. Social impact associated with migrant labourer and possible conflict with local population is envisaged. *Traffic Load:* At all project sites, the village road will be used for movement of trailer trucks carrying solar plant parts and other heavy vehicles for the project activity along with the movement of labours and other project materials. Hence, the impact w.r.t increase in traffic load is envisaged. *Impact on land*: Only private agricultural land has been procured, rain fed agriculture was being practised on the private agricultural land parcels obtained. Besides, the escalating cost for cultivation and rising labor cost, profit from agriculture has gradually declined. Hence, the farmers of the region have opted for sale of land to ReNew for a more ensured profiting supporting option. Hence, no physical or economical displacement is envisaged w.r.t the proposed project.
Key Project Impacts – Operation Phase	*Soil contamination:* storage / improper disposal of broken / damaged solar panel may result in soil / ground water contamination. *Impact on groundwater resources*: Impact is envisaged during the operation phase on the ground water resources as water will be required for washing of solar panels. Moreover, jet water spray method/dry cloth wiping method would be further adopted for minimizing the consumption of water. Hence, in case groundwater is abstracted for washing of solar modules, the impact for the same can be envisaged as moderate for all three project sites. *Occupational health and safety of workers:* Accidents like electrocution, short circuits may lead to occupational health and safety issues, for which proper training to workers need to be given to combat the same as well as it needs to be further ensured that the workers wear appropriate PPE's according to their nature of work involved. *Social Welfare:* To reduce the dissatisfaction among the locals regarding the project activity, maximum job opportunity should be provided to the locals. Besides, a community development plan along with a grievance redressal mechanism should be followed. Complaints received by locals should be registered, investigated and timely resolved.
Key Mitigation Measures	Appropriate mitigation measures has been planned and recommended in the ESIA report. These measures will minimise the impacts on air, water, soil, noise quality, solid and liquid effluent waste, ecology and socio-economic conditions. The activities of the project during both construction and operation phase will help in improving the socioeconomic condition of the surrounding area. *Construction Phase* • Drainage study and drainage management plan should be formulated • Restoration of village road if damaged due to movement of heavy vehicles

	• Water sprinkling of road should be undertaken to reduce the fugitive emissions during transportation. • Proper PPE's viz. gloves, glasses, helmet and shoes should be worn by workers while handling solar panels as well as during other activity during construction phase. • The accessibility of the locals should not be impacted due to solar power plant, Alternative access should be provided to compensate for access restriction if any. • It should be ensured that the accommodation provided to the migrant workers should have basic amenities such as electricity, drinking water, health & sanitation facility and kitchen. • Integral noise shielding to be used where practicable and fixed noise sources to be acoustically treated, for example with silencers, acoustic louvers and enclosures. • Hazardous materials such waste oil, used oil should be stored at designated locations in enclosed structures over impermeable surface. • During procurement of private land, adequate compensation amount in terms of agreed price can nullify the impact. Sale price should be mutually agreed through proper stakeholder engagement. No land is to be purchased from tribal population. • Complaint register should be maintained onsite to receive complaints from locals and workers. • Recovery of ground storey (mostly grasses and herbs) vegetation under the PV panels and in other places that do not need to remain cleared shall be encouraged to grow. • Planting native, fast growing trees on access roads and/ or in nearby barren areas/ schools/ Panchayat office which may also give an alternate habitat to the faunal species especially the bird species and maintain the ecological balance. *Operational Phase:* • Appointment of authorized recycler for broken / damaged solar modules. • Implement the recommended complaint resolution procedure (Grievance Redress Mechanism) to assure that any complaints regarding any issue related to project activity is not left unnoticed. The complaints should be registered, investigated and timely resolved. • Continuous monitoring of drainage situation in the area due to possible obstruction to water flow due to the project activity • High alert and preparedness for any flooding at site, availability of pumps at sites to pump out excess water at short notice in the event of heavy rainfall
Conclusion	The proposed solar power project is not likely to have significant adverse environmental impacts that are sensitive[1], diverse or unprecedented. It is envisaged to have moderate impact due to issues related to community safety during the construction period, insignificant impact due to generation of dust and fugitive emissions during construction phase only (short duration) and minor impact on resource utilization like land and socio economic conditions of project area villages. There is no impact on cultural resources in the study area. The impacts anticipated during the operation phase is fugitive emissions from movement of project vehicles within the site (air environment), surface run off and onsite drainage of storm water (water environment), impact on soil due to storage and spillage of hazardous wastes used oil and transformer oil (land environment) as well as use of ground water resources during operation phase, which can be mitigated by adopting suggested mitigation measures. Based on the conclusion drawn from the ESIA study with respect to the kind of impacts of the project on environment, resources, biodiversity, labours and community, the proposed project is categorized as **Category B** from the perspective of environment safeguard. While categorised as Category C for Involuntary Resettlement and Indigenous People.
This Executive Summary should be read in conjunction with the full report and reflects an assessment of the Site based on information received by Arcadis at the time of reporting.	

[1] A potential impact is considered "sensitive" if it may be irreversible (e.g., lead to loss of a major natural habitat), affect vulnerable groups of ethnic minorities, involve involuntary displacement and resettlement, or affect significant cultural heritage sites.

1 INTRODUCTION

1.1 Background

M/s ReNew Power Venture Pvt. Ltd. is an independent power producer company and first IPP in India to cross an installed capacity of 1000 MW from clean energy projects. ReNew Solar Energy Pvt. Ltd. (A SPV of ReNew Power) is planning to develop a 65 MW (AC) solar PV power plant near the Yelkurthi village of Medak district in the Telangana state of India. The power purchase agreement has been signed with the DISCOM which is Southern Power Distribution Company of Telangana Limited (SPDCTL). The EPC contractor for developing the solar power plant will be Sterling and Wilson and is rated as one of the prime Solar EPC solution providers in India with installed capacity of more than 300 MW.

The proposed project will be developed at Korampally, Yelkurthy and salojipally Villages of Medak District, Telangana. The solar intensity at the site has been assessed and found as favourable to develop solar power project. Telangana receives a global horizontal radiation (GHI) in the range of 5 to 5.5 kWh/m^2/day. The plant is expected to generate about 147,633.30 MWh annually.

A solar power plant is a superior and a clean option for power generation in comparison to non-renewable fossil fuels. Ministry of Environment, Forest and Climate Change (MoEF&CC) in its **Office Memorandum No. J-11013/41/2006-IA.II (I)** dated 13th May, 2011 (**Appendix A**) stated that the solar photovoltaic power projects are not covered under the ambit of EIA Notification, 2006 and therefore does not require prior environmental clearance. Moreover, solar power plant has been categorized under white category and exempted to obtain consent to operate (CTO) from state pollution control board. CPCB in its order published on 7th March 2016 has directed to all the SPCB about the categorization of industries. This categorization has been done on the basis of potential of industries to cause pollution. All the non-polluting industries has been categorized under white category and does not requires consent to operate (CTO). Only, intimation to SPCB while starting the industry will suffice.

ARCADIS India has been appointed by ReNew Power, as an independent environment consultant to undertake the ESIA study. The ESIA was conducted to assess any potential impacts (both negative and positive) that may arise from the construction, operation and decommissioning of the proposed solar plant. The goal of the ESIA is to enhance sustainability of vital ecosystem, to improve or restore ecosystem health and biodiversity. Environmental sustainability in relation to the proposed solar power generation project will be enhanced by designing the solar power plant that gives competitive advantage over existing energy sources. The overall benefits of the proposed solar power system are expected to outweigh the potential negative impacts (if any). The Environmental and Social Impact Assessment (ESIA) study for the project has been undertaken in accordance with terms of reference approved by ADB for this project, International Finance Corporation's (IFC) Performance Standards (PS) on Social and Environmental Sustainability, 2012; Environment, Health and Safety Guidelines, Equator Principles; Relevant ILO conventions covering labour standards. The study will also assess the sustainability of the project w.r.t the local and national regulations relevant to the project.

1.2 Project Location

The project is spread over three sites of 120, 200 & 125 acres located in Yelakurthy, Korampally & Salojipally villages. All the sites will be connected using a 33 KV overhead line. The generated electricity will be evacuated to the 220 KV utility substation located at Minpur Village. The length of transmission line between power plant and utility substation is expected to be approximately 13.4 km. The salient features of the project are summaries in **Table 1.1.**

Table 1-1: Salient Features of Project

SN	Salient Features	Details
1	Project Owner	ReNew Solar Energy Pvt. Ltd.
2	Total Project Capacity	65 MW
3	Location of Site	Yelakurthy, Korampally & Salojipally village
4	Tehsil/Mandal	Tekmal
5	District	Medak
6	State	Telangana
7	Project Coordinates	17°57.951' N and 78°03.968' E
8	Nearest Town	Jogipet
9	Nearest City	Sangareddy
10	Total Land Area	445 acre
11	Type of Land use	Agricultural land and fallow land
12	Proposed Technology	Solar PV module based on C-Si technology
13	Project Life	25 years

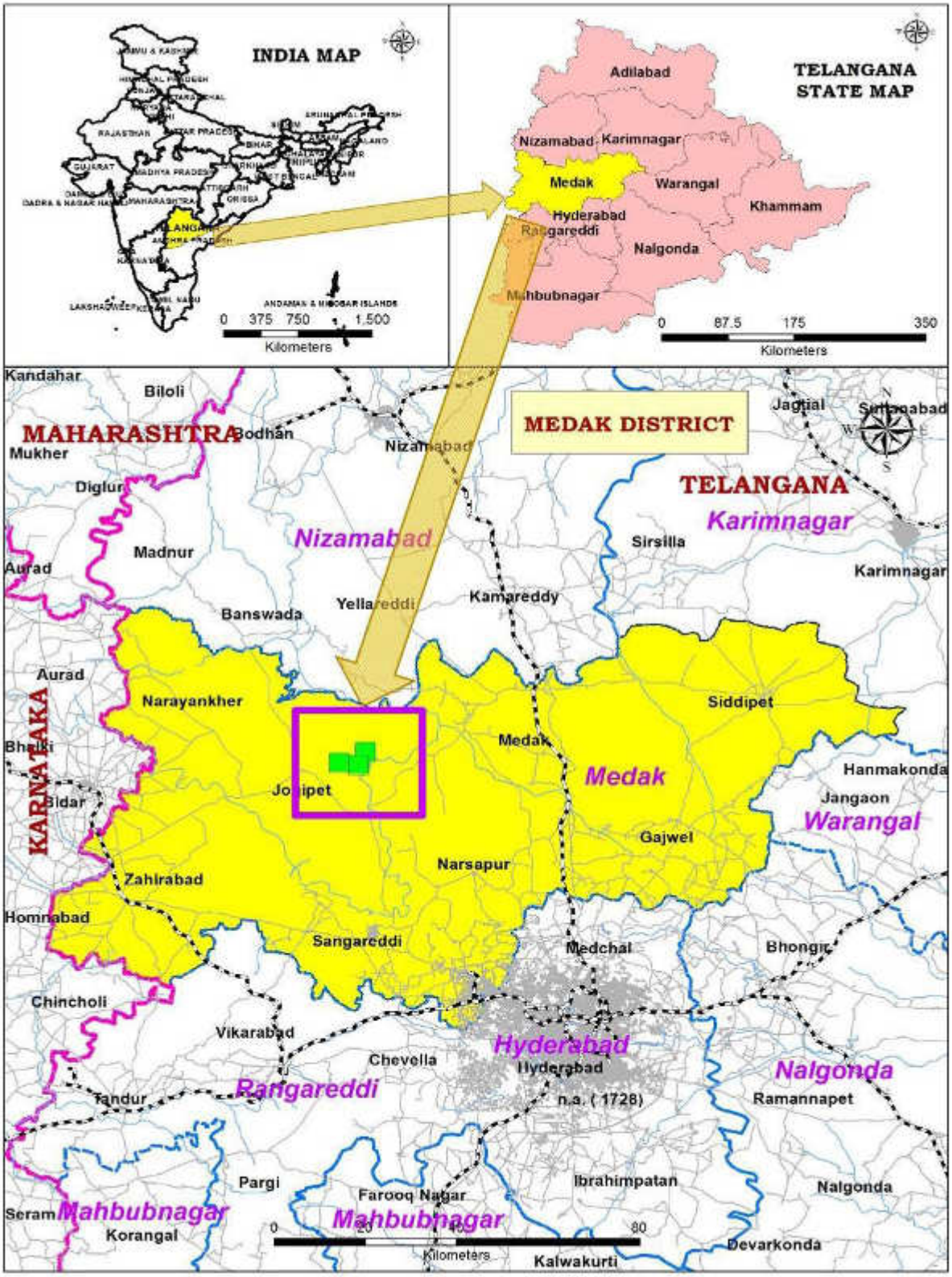
1.3 Project Phase and Status of Permits

The 48 MW proposed solar power plant is in initial phase where the land procurement is nearly completed and site boundary has been identified for Korampally and Yelakurthy site. Land identification has been completed and procurement was under process for Salojipally site during the time of this ESIA study. The required permits and approvals for the construction and operation of the project are summarised below:

Table 1-2: Required Permits & Approvals for the Project

S.N	Permits/Approvals	Status
1.	Consent to Establish from Telangana Pollution Control Board	Not required. However, Telangana Pollution Control Board needs to be informed while starting the project.
2.	Permission for laying power evacuation line	As per PPA, same is not required
3.	Power Purchase Agreement	Signed with Southern Power Distribution Company of Telangana Ltd. Dated 26th February 2016
4.	NOC from Village Panchayat for land uptake	Single window approval application is under process.
5.	Approval for use of Ground water	Single window approval application is under process for ground water approval.
6.	Private land uptake from land owners	Sale deed completed for 372 acres

Figure 1-1: Project Location Map



1.4 Purpose of ESIA Study

The main purpose of the ESIA study is to identify, evaluate and manage environmental and social impacts that may arise due to implementation and operation of the proposed project. The document

has been made to comply with the requirements of ADB, IFC's Performance Standards, IFC EHS guidelines, 2007 as well as applicable local and national regulations. The objectives of ESIA study are:

- To identify and establish the baseline environmental and socioeconomic conditions, to analyse the environmental and social risk and impacts of the project and its associated components (facilities like transmission line, access road etc.)
- To prepare an inventory of biodiversity (flora and fauna) of project site prior to implementation of the project to evaluate the possible impacts on avifauna, if any.
- Review of the land uptake process to assess any legacy or current/existing issues (like informal settlers, livelihood dependence, other usage etc.) on the purchased/ leased land through suitable survey using acceptable socioeconomic tools. This will help in assessing the impact of the project on the community/ villagers.
- Socio-economic survey involving consultation with local community, stakeholders, household surveys to identify the needs and problems of community with respect to the project activities.
- To suggest appropriate safeguards for the associated environmental and social risk, which may not lead to project investment and activities at risk.

1.4.1 Approach and Methodology of the ESIA study

The approach and methodology applied for undertaking the environmental and social impact assessment study is as provided.

- Desktop review of project related documents
- Reconnaissance survey to understand site specific issues.
- Discussion with the local community in the project influenced villages to understand their perception of the project and identification of key issues.
- Baseline noise level, air, water, soil, ecology and biodiversity data collection of the site through primary and secondary data source surveys.
- Identification of environmental and social risks associated with the project (including associated facilities) during construction, operation and decommissioning stage.
- Preparation of an environmental and social management action plan (with timelines & responsibilities) & Environmental monitoring plan to manage these risk and impact.

1.4.2 Limitations

The study is based on the project planning information and document provided by the project proponent, community consultation and observation recorded during site survey. With the time constraints and initiation of ESIA study in August month, environmental monitoring has been conducted in monsoon season (September) therefore result may shows lower concentration. Any significant change in the proposed activities may result in variation of outcomes. Presented information and fact has been analysed and inferences has been drawn through the professional judgement.

1.4.3 ESIA Team

ARCADIS has mobilized a diverse team of multidisciplinary experts for conducting the ESIA study. A number of these experts are accredited professionals by Quality Council of India to conduct regulatory EIA. Combination of these experts have provided consultancy services to over 30 solar power projects across India with over 1550 MW installed capacity. The experts have been continuously working with funding agency and understand the modalities and procedures of evaluating and addressing environment and social risk associated with large scale investment.

1.4.4 Structure of ESIA Report

Chapter 1: Introduction

Chapter 2**:** Project Description

Chapter 3**:** Applicable Policies, Legal and Administrative Framework

Chapter 4**:** Description of Environment

Chapter 5: Analysis of Alternatives

Chapter 6**:** Social and Environmental Impact Assessment

Chapter 7**:** Environmental and Social Management Plan

Chapter 8**:** Conclusions

2 PROJECT DESCRIPTION

The proposed solar power plant is being developed under Telangana Solar Power Policy 2015. The proposed plant is planned to be commissioned by June 2017. The technical features of project is provided in **Table 2.1** and satellite imagery of the project site is shown in **Figure 2.1**

Table 2-1: Technical Features of Project

Particulars	Details
Project Capacity	65 MW
Annual Global Horizontal Irradiation (kWh/m^2)	1,965.0
Annual Global Irradiation Incident (kWh/m^2)	2391.3
Module peak power (Wp)	315
Number of Modules per string	20
Per Module Area (m^2)	1.938
Pitch (m)	5.0
Peak power of plant (MWp)	78
First Year Energy Yield (MWh/annum)	147,633.30
First Year Specific Yield (kWh/kWp)	1,892.73
Performance Ratio (PR) (%)	79.15%

2.1 Present Status of Project

The project site visit was conducted in August 2016 and found that project is in initial phase and land procurement is under process. Project site boundary has been marked for Yelakurthy and Korampally site. Also, land for access road has been identified and procurement is ongoing. To some extent village road is also being used as access road. All the three project site and immediate vicinity are presented in **Figure 2.3.**

Figure 2-1: Satellite Imagery Showing the Proposed Project Site

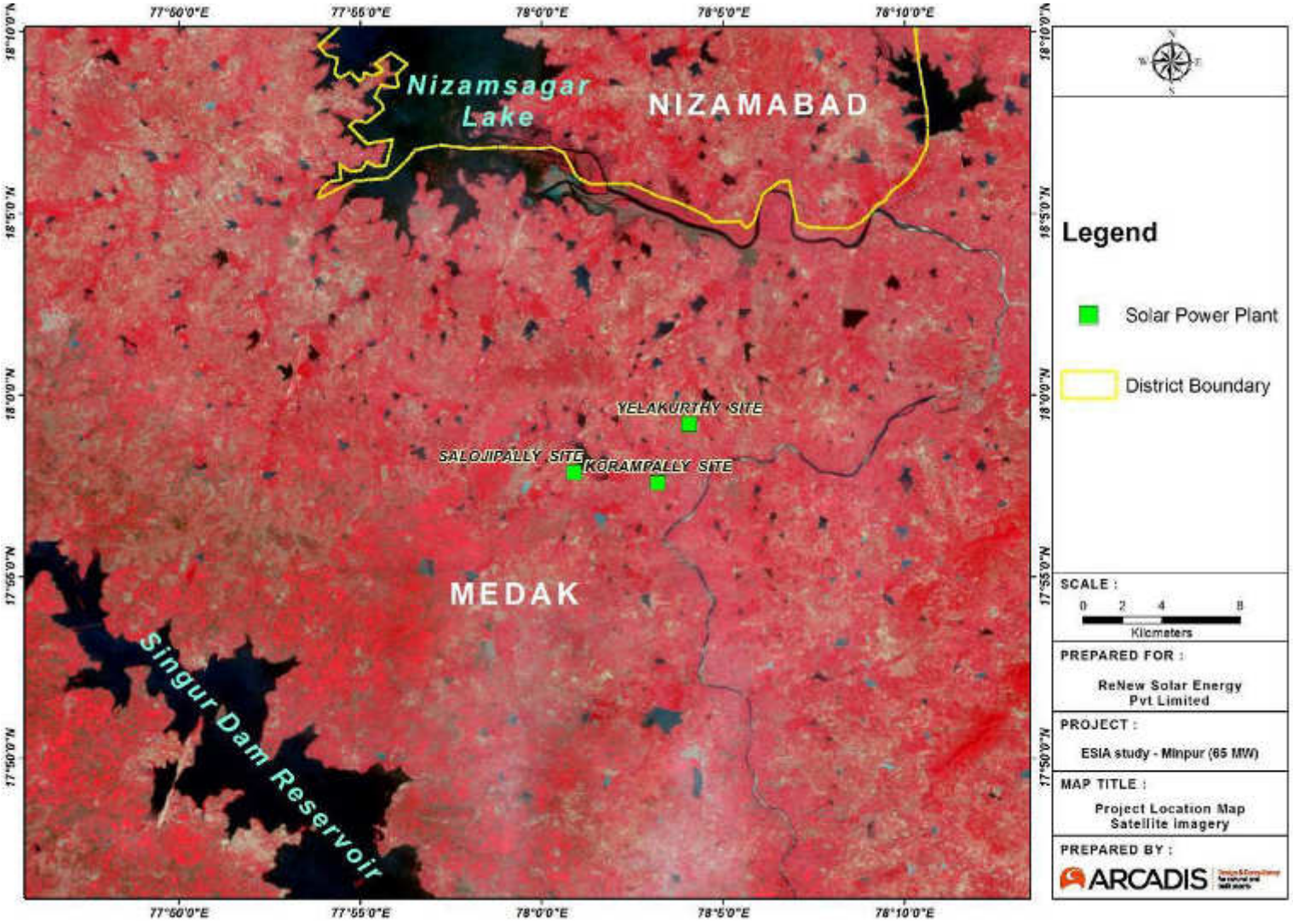
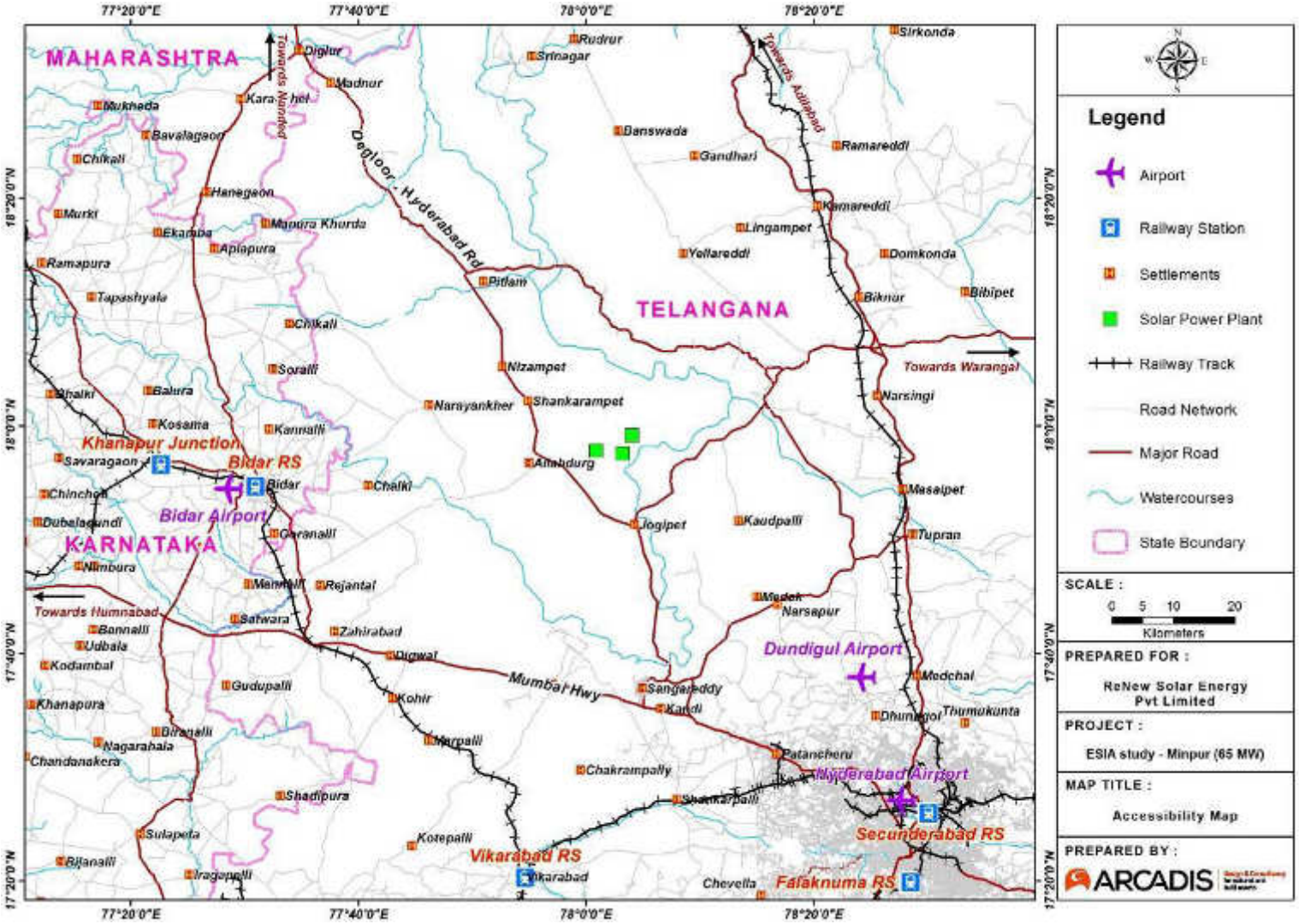


Figure 2-2: Accessibility of the Project Site



2.2 Site Suitability and Justification of Project

Following analysis describes the site suitability for a Solar PV power plant development, these analysis include:

- **Solar radiation at the site:** Solar radiation map of India indicates that Telangana receives a global horizontal irradiation (GHI) in the range of 5 to 5.5 kWh/m^2/day. The first year energy yield prediction of the site data was estimated to be 147,633.30 MWh/annum.
- **Topography:** The project site is spread across an open area with very mild slope in multiple directions. Erection of solar panels is being undertaken through varying the height of the poles required for mounting solar panels. Hence, the installation is easy and reduces the cost of technical modifications required to adjust for undulations at the ground.
- **Substation proximity:** The proposed solar power plant will be connected to 132KV substation, located 10-12 km away from the project site.
- **Accessibility**: All the three sites are located close to the village road and are easily accessible. Approach roads from the village road to the site is to be built and strengthened to a metalled road for movement of the heavy vehicle coming inside plant. Lingampally Railway Station is the nearest railway station with a distance of 47 km. The nearest airport is Hyderabad airport at a distance of about 75 km from projects site. Figure 2.2 shows the accessibility of the project site.
- **Geological and soil conditions:** To ascertain soil parameters of the proposed site for construction of foundations for module mounting structures, control room, HT lines & array yard, drainage etc., the sub soil investigation through certified soil consultant has been carried out. Geological and soil investigations report confirm soil strength to support structures.
- Near and far shading effects due to objects like transmission lines, trees, hills, wind farms etc. Small trees and shrubs are present in project site surrounding.

In light of above discussion, the site has been found to be technically feasible for a solar power development as per all factors discussed above.

2.3 Project Settings

The key physical features of the project site have been described below:

- The proposed site has mix terrain (flat land and slightly undulating land). The project site is surrounded by agricultural fields. However, project site land is mostly non-agricultural fallow land.
- There are no shading elements such as mountains or huge trees available on the site. Small and medium sized trees like *Azadirachta indica, Acacia spp*. are present in or near the site.
- The vicinity of project site has natural canal and ponds. River Manjira flows at a distance of 2.2 km east of the project site. Manjira River is a tributary of River Godavari. A manmade reservoir is also present near the boundary of the Korampally site. A canal is being built running parallel to the east boundary of the Yelakurthy site. A natural perennial reservoir and a natural drain is located very close to the salojipally site.
- The nearest village settlement from Korampally site is Korampally village located south east at a distance of 920 m; from Yelakurthy site is Yelakurthy village located north east at a distance of 900 m; and from Salojipally site is Salojipally village located south east at a distance of 920 m.

2.4 Project Design, Technology and Component

The proposed 48 MW solar power plant will be based on C-Si technology. The system consists mainly of the following components:

PV Modules: All solar module mandatorily have to adhere to IEC specification given in IEC 61215 for crystalline silicon module. For optimum energy generation Crystalline Silicon 315Wp module of JA Solar (Model: JAP6 72-315/3BB) has been chosen for this project.

Transformers: Step-up transformers of 0.380/0.380/0.380/33kV, 3MVA and 0.4-0.4/33kV 2MVA, 50Hz ONAN/ONAF type suitable for continuous operation will be used. There will be two power transformer for 65MW plant in the switchyard section having of 3-phase, 35/40MVA, 220/33kV, 50Hz ONAN/ONAF type step up transformer. This 220KV voltage level of 65MW power plant is transmitted to Utility substation through single circuit transmission Line.

Substation at Minpur Village-

Mounting Structure: PV modules are mounted on mounting structures to keep them oriented in right direction with a tilt that is optimised to have maximum irradiation and to provide structural support to the PV modules. Mounting systems may be either fixed or tracking type. Horizontal single axis tracker (HSAT) system was selected for the proposed 65MW plant.

Horizontal single axis tracker: These are the most common single axis trackers. They rotate on an axis parallel to the ground and are ideal when they track the sun in the east-west direction. Planarity ensures that all modules point uniformly in a particular direction – maintaining a geometry that reduces rotor maintenance over time. Horizontal single axis trackers can be packed closely, similar to fixed structures. This results in them being capable of achieving a high power density per acre.

Power Evacuation: The 33kV output from inverter stations in the project site are combined together at 33kV switchboard and transmitted to 220kV substation. Power is further stepped up to 220kV through two power transformers rated at 35/40MVA, 220/33kV, which is then evacuated at 220/132kV substation located at 10-12 km from site through S/C transmission line.

Transmission Line: As per detailed project report (DPR), a transmission line of length 10kms and 33kV capacity would be laid to the feeder bay in 220/132kV Minpur substation. Necessary metering and protection will be provided to ensure acceptable billing and safety to equipment and work force. The approach route identified for the transmission line will be based on a criterion to reduce the environmental and socioeconomic footprint of the transmission line. The shortest feasible route after considering these factors will be selected for the transmission lines:

- Transmission line route does not fall under any habitations and thick vegetation.
- No households or community structures are located in the route of the transmission line.
- All environmentally sensitive sites, archaeologically significant sites, areas of ecological and cultural significance were avoided while selecting the route.
- Right of way/ access roads are shared with local residents of the area wherever possible.

2.5 Climate Change Effect on Solar Power Plant

Energy from solar power plant is directly related to fluctuating weather conditions. The vulnerability of solar power components due to climate change has been studied in various researches and publication. In Solar power plant, photovoltaic panels with an operating life time of 25 years are vulnerable to hail, wind and extreme temperature (Patt et al. 2010). Solar cell output usually rated at 25^0C and it decreases for each temperature rise of 1^0C after that hence increase in temperature will decrease the performance of solar cell. As the solar radiation assessment has been conducted for the proposed project and

module has been designed in line with the assessment finding therefore solar power performance is not anticipated to reduce unexpectedly over the period of 25 years (project life cycle).

Cloud cover is another factor which influence the performance of solar panel's output and this performance can decrease by 40%-80% within a few seconds. However, it increases dramatically as the sky clear (Kleissl 2010).

Higher wind speed can also increase dust particles deposit over the panels which decrease solar photovoltaic cell output (Goosens and Van Kerschaever 1999), but higher wind can also cool the modules, increasing efficiency and output.

Another component of solar power plant is inverter. Studies, consistently show that the inverter, which Converts direct current power output into alternating current (DC to AC), is the most unreliable component of a photovoltaic system, accounting for up to 69% of unscheduled maintenance costs (Patt et al. 2010). However, they are not usually directly exposed to the weather and are not especially vulnerable to climate change.

Following checklist of ADB has been referred for preliminary climate risk screening:

Screening Questions		Score	Remarks
Location and Design of Project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?	0	Not likely Solar modules have been selected considering the temperature range in the area (42- 45 ^{0}C in Medak district)
	Would the project design need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?	1	Likely Natural drains of seasonal nature exist near the project site which becomes active during the monsoon therefore project component and site design should consider the risk of local flooding
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?	0	Not likely Project can be establish within a short time period of 4-5 months (approx.) therefore impact of climate change on material and maintenance is not expected
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s)?	0	Not likely
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?	1	Likely Although project has been designed after consideration of temperature variation (annually), significant variation in temperature over the period of project life cycle may affect its performance.
Total sum of scores		**2**	

Risk evaluation

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project. In The proposed project, total scores is 2 which means project is of medium risk due to climate change.

2.6 Resource Requirement

2.6.1 Land Requirement

Project Site

There are 3 sites in Korampally, Yelakurthy and Salojipally villages located within Tekmal Mandal of Medak District of Telangana. The details of Land Distribution for the entire 65 MW is proposed on private land parcels distributed in the mentioned three villages. The procurement of land is in way to completion. Land taken on each villages are contiguous and the topography of the project site is largely plain. The project site is an open vast area with mild undulations. Land in the project influenced area was predominantly used for irrigated & rain-fed agriculture and grazing. Agriculture in the area is majorly dependent on irrigation and large portion of the land remains dry most part of the year. Though irrigation facility is not in the optimal state in the area. Advent of the new solar projects in the region will open opportunities for utilization of land which is left unused otherwise. Site wise Power Generation capacity is yet to be finalised.

Table 2-2: Village Wise Land Distribution

District/ State	Village	Land Type	Land (Target)	Status
Medak, Telangana	Korampally	Private	200 Acres	Procured
	Yelakurthy	Private	120 Acres	Procured
	Salojipally	Private	125 Acres	Procurement under progress
Total Land			445 Acres	

A total of 445 acres of land is required for the entire 65 MW Solar Power Project distributed in three mentioned villages. The procurement of land is on way to completion during the time of visit by the ESIA Team. For JAP6 72-315/3BB module type used for the proposed site, there is approximately 5 acres/ MWp of land requirement. It was informed to the visiting ESIA Team by the representative of ReNew Saur Shakti Private Limited only private lands, most of which are cultivation land will be procured for the project. As per the information provided by the ReNew Saur Shakti Private Limited about 445 acre of Private Lands will be procured in total to meet the project requirement. During Consultation the Land aggregator and the representative of Project Proponent informed that all lands are being bought directly from willing land owners on willing to sell willing to buy basis. It was testified by some of the Land owners while interaction was made with them. As per ReNew no physical displacement happened due to the project and private land has purchased through good faith negotiations based on willing sellers and willing buyer basis, which was confirmed on the basis of following;

- Sample copy of sale deed
- Primary consultation with landowners
- Consultation with land aggregator

- Analysis of market value of land to verify compensation provided to landowners are higher than the circle rate.

As reported till date, out of the 3 sites sale agreement has been nearly finalised at for villages i.e. at Korampally and Yelakurthy village. However, procurement for land in Salojipally (supposed to be 125 Acres) is yet to be finalised.

Table 2-3: Project Component Wise Land Breakup

S.N.	Project Components	Required Land (Acres)	Remarks
1	Solar site	445	Including access road and sub station
2	Transmission Lines		Transmission line will be around 13.4 Km length. Land requirement for one tower is 6 m X 6 m. No. of towers and land required is not yet finalised.

Land for access road

An exclusive access to the construction site is usually required prior to mobilization of manpower and machinery. As informed by the representatives of the Project Proponent till the time of site visit the access route has been demarcated only at Korampally village and land for the same purpose were in process of finalisation. It was informed by the RSSPL representative that at Korampally village the tentative length of the approach road will be about 300x30 m. About 40 acres of land, within the total 200 acres that has been procured, would be utilised for the purpose. All the 3 site locations are either on or very close to the main road crossing through the area namely Chinthakunta- Kottapally Road. State Highway No. 16 (Medak- Bodmatpally Road) is also within 3.5 Km, 2.19 Km and 0.88 Km from Korampally, Yelakurthy and Salojipally site locations respectively. At all the three sites land is required exclusively for access routes/ approach roads, but till the time of visit final demarcation for the purpose was done only at Korampally site and yet to done for Yelakurthy & Salojipally site.

As seen in Korampally and informed by the representative of RSSPL the access road might be restricted to local people and will be utilised exclusively for the project. However, as seen during site visit, the approach road will emerge from the main road i.e. Chinthakunta- Kottapally Road leading to the project site.

Korampally is a small Village/hamlet in Tekmal Mandal in Medak District of Telangana State, India. It comes under Korampally Panchayat. It is located about 37 Km towards North from District headquarters Sangareddy. There is no railway station near to Korampally in less than 10 km. However, Secunderabad Jn Rail Way Station is major railway station 89 KM near to Korampally. Road Transportation like Buses are available on nearby SH 16 and local people use self-owned two wheelers or auto rickshaws for transportation in the nearby places. Hence, it can be surmised that transportation facilities is not satisfactory from the site areas. Issue regarding RoW can be addressed only after finalisation of land demarcation in rest of the sites.

Land for transmission line & PSS

The land area required is small for transmission pole laying i.e. 6m X 6m. Land requirement for transmission line will be limited to the area required for the foundation of pylons and a distance of 13.4 km will be traversed by the transmission lines. The land will be used by paying a one-time compensation based on negotiation with land owners (which includes the compensation for crops in the Right of Way of transmission towers & transmission line). The route for the transmission line has been selected based on the following factors:

- Transmission line route planned to avoid major habitations along the route;

- No house or community structures located under the transmission line;
- Areas requiring extensive clearing of vegetation should be avoided;
- There is no ecological sensitive area on the route of the transmission line.
- Area required is small 6mx 6m and is purchased by paying a onetime compensation (which includes the compensation for crops in the Right of Way).

As informed by RSSPL representative Pooling Substation (PSS) will only be at Korampally site. As per the Detailed Project Report (DPR) of the present 65 MW Plant to be built at the three said sites, provided by RSSPL, the power generated in the plant at 220KV shall be fed to Minpur substation located approximately 10kms from the Project site through a single circuit transmission line. The point of interconnection will be at the Minpur substation.

Land Holding Pattern: During discussions with the local community, it was understood that the average land holding size in the villages is 5-7 acre per household, most of which are agricultural.

Private land purchase process

As per discussions with the land aggregator, only private land has been purchased for the proposed project. RSSPL has their own land procurement procedure. The procedure is flexible and allows for modifications at the project level based on relevant laws and state level requirements. Also, RSSPL has their own land Cell and directly involved in land procurement through appointed Land Aggregator. The Land Cell is involved in identification, selection and procurement of land from willing land providers on a negotiated settlement basis. This was confirmed on the basis of following evidences.

- Consultation with Representative of the Project Proponent, Land Owners and Land Aggregator.
- Sale Deeds information is provided by the Project Proponent.

As per the private land procurement procedure, the following steps are taken:

- Based upon the solar resource assessment, a first draft micro sitting layout is prepared from which a set of locations that can be procured is available. Based upon further survey to establish feasibility of locations, the first set of target lands is identified.
- Discussions / negotiation with land owners are held and purchase terms agreed upon. Land documents are collected and title is vetted.
- Land aggregator to undertake community consultations and individual negotiations with the land owners under the project.
- An agreement to sale based on negotiations will be arrived at and all aspects for purchase will be discussed with land owners.
- All the land acquired for the project if a private land, it is obtained at market price (3-4 lacs per acre) or negotiation with farmers. Each farmer is offered the same price on a per acre basis for his farm.

During Consultation with the Sub registrar, Land aggregators and the representatives of Project Proponent informed that all lands are being procured are private land and are purchased through willing to sale and willing to buy basis. It was testified by the Land owners while interaction was made with them.

2.6.2 Water Requirement

During the project construction phase, water is required for preparing RCC foundations for module mounting structures, building control room and security rooms, and domestic purposes such as drinking

and washing by the construction workers and staff. During operations, water will be required for cleaning of solar panels and also for domestic purposes for the operations staff. The estimated quantities of water required during the construction and operation phases are presented below in **Table 2.4.**

Table 2-4: Water Requirement during Construction and Operation Phase

Phase	Activity	Max. Consumption
Construction	Civil works water requirement	6-8 KLD
	Domestic use – drinking (during peak construction phase).	13.5 KLD
Operation	Washing of solar panels (1.938 m^2 each panel)	1.6 litre for each panel[2]
	Domestic use – drinking and washing by 10-12 site personals and security guards	0.5 KLD

During construction and operation phase, ground water through already installed bore wells by farmers/landowners will be used to meet the demand. Drinking water needs during the construction phase will be met via local tankers. In operational phase, RO water will be made available for the drinking purpose.

2.6.3 Manpower Requirement

About 300 labours is estimated to be employed in the peak phase which involves the foundation structural work, fencing, cleaning and erection of mounting structure. Some female workers is also expected to be engaged. The contractor workforce will be comprised of both skilled and unskilled labours. Some workers may be sourced from the nearby villages depending on their skills and capabilities. In the operational phase, a total of 10-12 personnel will be required onsite including security guards, operation and maintenance officer and site engineers.

2.6.4 Waste Water Treatment and Disposal System

During the construction phase, the waste water or sewage from site office toilets will be disposed in a septic tank. Waste water will be generated during the operation phase due to solar module washing on a monthly basis. Proper storm water channels would be constructed along the periphery of the project site for draining of site run off. The domestic waste water would be managed through septic tanks already constructed.

2.6.5 Logistic Arrangement

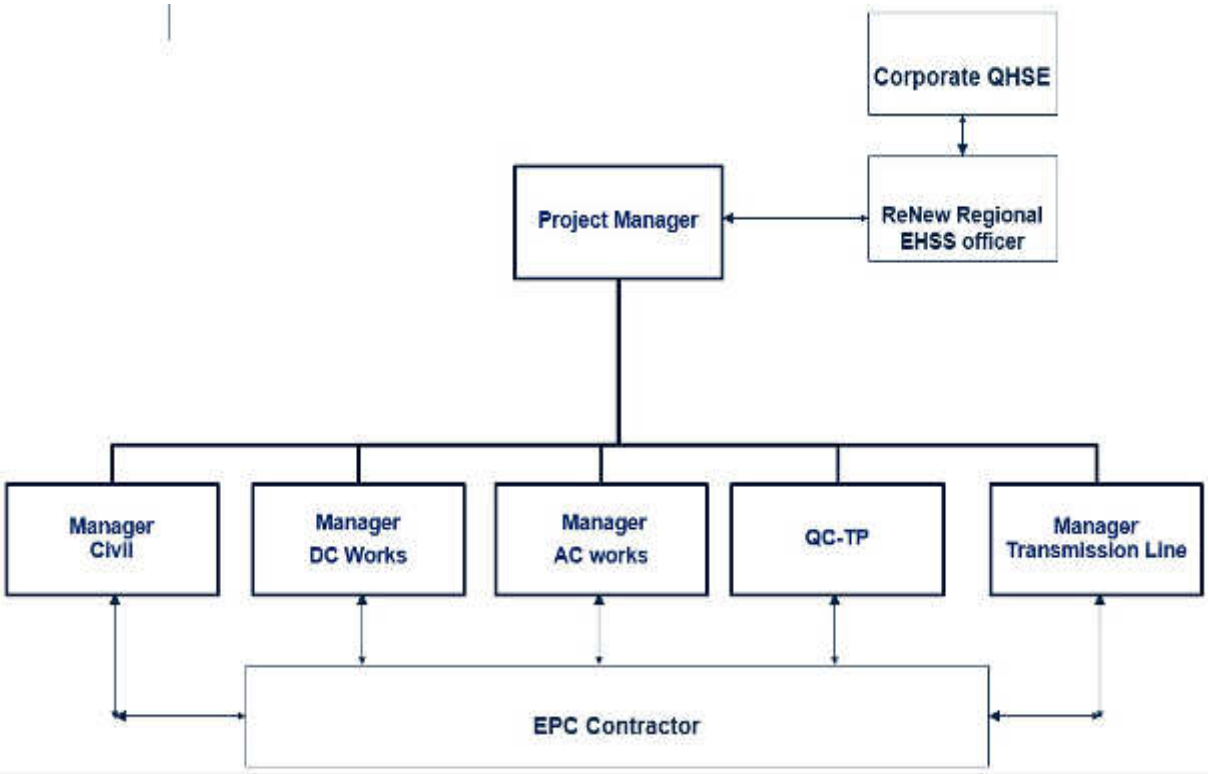
Labour Camp: During the site visit, the project was in its initial phase and land procurement was under process. Sterling and Wilson will be the EPC contractor. The plan is to hire unskilled labours locally therefore reducing the requirement of labour camp. Onsite labour camp will be constructed to house only the migrant labours once construction activities starts. As informed, all the basic facilities and amenities such as drinking water, separate kitchen, crèches for children, sufficient toilet and rest room will be provided in the labour camp.

Project Vehicles: Project vehicles such as water tanker, tractors, JCB, and cars will be hired to support various operations during construction phase and further efforts will be made to hire vehicles from local community.

[2] *https://www.ifc.org/wps/wcm/connect/f05d3e00498e0841bb6fbbe54d141794/IFC+Solar+Report_Web+_08+05.pdf?MOD=AJPERES,*

2.6.6 Organizational Structure

To ensure smooth completion of various operations or activities of project during construction and operational phase, ReNew Power has its own ESMS policy. During the project phase, project operations will be managed by Project manager and environmental, health & safety issues will be monitored by ReNew regional EHSS Officer. The organizational structure for 65MW solar poer project is given below.



2.6.7 Implementation Schedule for the Project

As per the Detailed Project Report (DPR), project is scheduled to commence operations in June 2017

3 APPLICABLE REGULATIONS, GUIDELINES AND STANDARDS

This section describes regulations, statutory guidelines and obligatory standards that are applicable to the social and environmental performance of the proposed project.

3.1 National Regulations

Environmental Protection has been given the constitutional status. Directive Principles of State Policy states that, it is the duty of the state to 'protect and improve the environment and to safeguard the forests and wildlife of the country'. It imposes Fundamental duty on every citizen 'to protect and improve the natural environment including forests, lakes, rivers and wildlife'.

In India the Ministry of Environment, Forests and Climate Change (MoEFCC) is the apex administrative body for (i) regulating and ensuring environmental protection; (ii) formulating the environmental policy framework in the country; (iii) undertaking conservation & survey of flora, fauna, forests and wildlife; and (iv) planning, promotion, co-ordination and overseeing the implementation of environmental and forestry programmes. Several laws have been framed for protection of environment and for Occupational Health & Safety in India by the Central Government. The relevant regulation pertaining to the project activity has been discussed as under. The compliance to all environmental, health, safety and social regulation have been presented in **Table 3.1**

Table 3-1: Applicable Environmental, Health, Safety and Social Regulation

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
1	Telangana Solar Power Policy 2015	Telangana New & Renewable Energy Development Corporation Ltd, Ministry of New and Renewable Energy, Govt. of Telangana And Ministry of Panchayat Raj and Rural Development, Govt. of Telangana	As per the policy, it will be the responsibility of the project developer to acquire land for the solar project. Even agricultural land can be acquired for this purpose. Land acquired for any solar project or for solar park will be deemed to be converted to non-agricultural land status and no further conversion procedures will need to be followed by the developers regarding the acquired land. The conversion charges would be as per the Agricultural Land (Conversion for Non-agricultural Purposes) Act, 2006. For land acquisition for solar projects and solar parks, the ceiling limit under the Land Ceiling Act will not be applicable. However, the land requirement will be decided at the rate of 2 hectares/MW or any lower limit based on the advancement of technology. It is referred there that Payment of Development Charges and Layout fee and permission from Gram Panchayat Development charges and layout fee of INR 25,000 per acre basis shall be levied payable to the respective Panchayat. On payment of such amount, the Gram Panchayat will accord necessary approvals for setting up of the Solar power project/ Solar parks including permission for bore wells. No further permission is required at the panchayat. For this purpose, a separate category will be created under the Panchayat rules. Gram Panchayat will give permission within 14 working days from the date of making payment of development charges failing which permission will be deemed to have been accorded.	*It is recommended that RSSPL has gone through the right legal permissions and procedures and complied with the obligations mentioned therein for all the Solar Project sites viz, at Korampally, Yelakurthy and Salojipally for the cumulative 65 MW Solar Power Plant.*
2	The Air (Prevention & Control of Pollution) Act 1981	State Pollution Control Board (SPCB)	As per this rule, Consent To Establish and Consent to Operate is required to be obtained. However, development of solar power plant falls under white category and therefore it is exempted to obtain CTE and CTO from state pollution control board. Reference: CPCB notification No. B-29012/ESS(CPA)/2015-16; dated March 07, 2016	*Solar power plant is exempted to obtain CTO. However, SPCB needs to be informed by the project proponent while starting the project.*

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
3	The Water (Prevention & Control of Pollution) Act 1974	State Pollution Control Board (SPCB)	As per this rule, Consent To Establish and Consent to Operate is required to be obtained. However, development of solar power plant falls under white category and therefore it is exempted to obtain CTE and CTO from state pollution control board. Reference: CPCB notification No. B-29012/ESS(CPA)/2015-16; dated March 07, 2016	*Solar power plant is exempted to obtain CTO. However, SPCB needs to be informed by the project proponent while starting the project.*
4	Forests (Conservation) Act, 1980 and Rules 1981	Forest Department	The Forest Conservation Act and Rules mandate projects requiring diversion of forest land for non-forest purposes to seek Forest Clearance from the Ministry of Environment and Forests.	*Not Applicable* *No forest land is involved for the project.*
5	Environmental Impact Assessment (EIA) Notification 2006 & MoEFCC Office Memorandum dated 30thJune'11.	MoEFCC	The EIA Notification 2006 and thereafter the MoEFCC Office Memorandum dated, 13th May 2011 exempts solar power project from obtaining prior Environmental Clearance from the regulatory authorities. But, under the provision of MoEFCC office memorandum dated 30th June 2011, requisite permission is required to be obtained from competent authority for water and land usage.	*Not Applicable. However, permission is required for usage of water. It is recommended that permission should be taken from the concerned village Panchayat.*
6	Environment (Protection) Seventh Amendment Rules 2009	CPCB	Ambient air quality monitoring has to be carried out and the concentration limits for the air quality parameters should be in compliance with NAAQS 2009. Activities in the project especially during construction should not result in exceeding National Ambient Air Quality Standards (NAAQS) for ambient concentrations of air pollutants (such as particulate matter). If violation of the Rules takes place then the penalty will be decided on the basis of the parent Air Act 1981.	*Not applicable since no significant air emission is expected from the project operation*
7	Noise (Regulation and Control) Rules 2000 amended in 2010	TPCB	The Rules stipulate ambient noise limits during day time and night time for industrial, commercial, residential and ecologically sensitive areas. The rules apply both during the construction and operation of the project. Violation of the standards for assessing the noise quality due to the project will lead to penalty as under the EPA Act 1986.	*Not applicable since no significant noise emission is expected from project activity*

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
8	Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules 2008	TPCB	These Rules outline the responsibilities of the generator, transporter and recycler/re-processor of the hazardous wastes for handling and management in a manner that is safe and environmentally sound. Project proponent need to obtain consent from State Pollution Control Board for generation and storage of hazardous waste like transformer oil, etc. irrespective of quantity of waste. As per the law the occupier and the operator of the facility should be liable to pay financial penalties as levied for any violation of the provisions under these rules by the State Pollution Control Board with the prior approval of the Central Pollution Control Board.	*Applicable during construction phase* *During the construction DG sets will be used for the civil work involved. As per the site observations, oil for DG sets is stored in enclosed containers. The operation phase of the proposed project will result in generation of some quantities of hazardous waste, mostly in the form of waste/used oil as well as broken solar panels. ReNew needs to obtain consent from TSPCB for storage of transformer oil. All the hazardous waste generated due to the project should be stored and disposed as per the requirements of the Hazardous Waste (Management, Handling and Trans-boundary Movement) Rules, 2008 i.e., on a paved surface in a designated area with adequate secondary containment, with adequate labelling and before it is disposed to an TSPCB approved vendor.* *Though not covered under the rule, the broken solar panels is recommended to be sent back to the manufacture or an authorised recycler.*
9	Environment (Protection) Second Amendment Rules 2002	MoEFCC	The DG sets installed during construction should comply with maximum permissible noise levels and noise control measures for diesel generators up to 1000 KVA capacity as specified in the Act.	*The power requirement during construction phase is met through DG sets, which will adhere to prescribed CPCB noise level limits and noise control measures.*
10	The Building and Other Construction Workers' (Regulation of Employment	Ministry of Labour and Employment	This Act provides for safety, health and welfare measures of buildings and construction workers in every establishment which employs or employed during the preceding year ten or	*Applicable during construction phase* *Project proponent will ensure through its contractors that basic amenities are*

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
	and Conditions of Service) Act 1996		more such workers. These measures include fixing hours for normal working day, weekly paid rest day, wages for overtime, provision of basic welfare amenities like drinking water, latrines, urinals, crèches, first aid, canteens and temporary living quarters within or near the work site. This Act also requires application of the following: Building or other construction workers' (regulation and Employment Conditions of Service) Central Rules 1998 & Workman's compensation Act, 1923 to buildings and other construction workers. These will be followed by contractor & developer during construction and operation phase.	*provided to the labours. Project proponent through its contractors should also ensure all vendors employed should have valid labour license. Compensation to workers (own and vendors) should not be below daily wage rate as specified by Government. Muster roll must be maintained. Employee ID card must be issued (own and vendors). Safety, health and welfare measures of building and construction workers as mentioned in the act needs to be complied with.* *Failure to comply results in financial penalty /imprisonment of the principal employer along with vendor and closure of project*
11	Central Electricity Authority (Safety Requirements for Operation, Construction and Maintenance of Electric Plants and Electrical Lines) Regulations 2008, (CET)	Min. of Power , Central Electricity Authority Telangana Power Transmission Company Ltd. (TPTCL)	The Act is applicable for the solar power plant as the plant is going to be having electrical appliances and facilities installed for grid connected power generation. As per the act, all equipment's and system installed should comply with the provision of the statute, regulations and safety codes.	*Applicable both during construction and operation phase* *Project proponent under provisions of the CET regulations ensure that the health and safety requirements and provisions for transmission lines specified under the rules are compiled.*
12	Workmen's Compensation Act, 1923 & Rules 1924	labour welfare board	The Act requires if personal injury is caused to a workman by accident arising out of and in the course of his employment, his employer should be liable to pay compensation in accordance with the provisions of this Act.	*Applicable during construction phase* *Project proponent should ensure through its contractors in case of any accident/ injury/ loss of life the workmen should be paid a minimum compensation as calculated under this act both during construction and operation phase of the project. The reporting of accidents needs to be done in prescribed forms as per the act and the incident / accident register needs to be maintained accordingly. The Act also gives a framework for calculating amount of compensation and wages.*

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
13	The Contract Labour (Regulation and Abolition) Rules, 1971 Contract Labour (Regulation And Abolition), 1973	Labour Welfare Board	The Contract Labour (Regulations & Abolition) Act, 1970 requires every principal employer of an establishment to make an application to the registering officer in the prescribed manner for registering the establishment. The Act and its Rules apply to every establishment in which 20 or more workmen are employed on any day on the preceding 12 months as contract labour and to every contractor who employs or who employed on any day preceding 12months, 20 or more workmen. It does not apply to establishments where the work performed is of intermittent or seasonal nature. An establishment wherein work is of intermittent nature will be covered by the Act and Rules if the work performed is more than 120 days in a year, and where work is of a seasonal nature if work is performed more than 60 days in a year.	*Applicable during construction phase* *All vendors employed including contractors should have valid labour license. Compensation to contract workers (own and vendors) should not be below daily wage rate as specified by Government of India. Muster roll must be maintained. Employee ID card must be issued (own and vendors). Safety, health and welfare measures of building and construction workers as mentioned in the act needs to be complied with. Failure to comply results in financial penalty. Failure to comply results in financial penalty.* *Renew through its contractors should also ensure that conditions like hours of work, fixation of wages and other essential amenities in respect of contract labour are provided and in compliance with the standards.*
14	Minimum Wages Act, 1948	Labour Welfare Board	This Act provide for fixing minimum rates of wages in certain employments and requires the employer to provide to every worker engaged in a scheduled employment to be paid wages at a rate not less than the minimum rate of wages fixed by such notification 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.	*Applicable during construction phase*
15	The Child Labour (Prohibition and Regulation) Act, 1986	Labour Welfare Board	The Act prohibits employment of children in certain occupation and processes. The Act also specifies conditions of work for children, if permitted to work.	*Renew Power should ensure that no child labour is engaged at site for construction or operation works either directly or by the sub-contractors. Renew Power should include a clause in the subcontractor agreements prohibiting employment of child labour.*
	Companies Act, 2013	Renew Power	According to Schedule 135 sub -section 1, the companies meeting the threshold criteria (Minimum net worth of rupees	*The project will need to comply with the requirement as stated in the law.*

S.N.	National Environment, Health & Safety Regulation	Agency Responsible	Requirement	Applicability
			500 Crore, Turnover up to "1000 Crore" and having a net profit of at least '5 crore') specified should spend in every financial year, at least 2% of the average net profits of the Company made during the three immediately preceding financial years in pursuance of CSR policy.	
16	Panchayat (Extension to Scheduled Areas) Act 1996	Renew Power	Provisions of this rules are: • A state legislation on panchayats in the scheduled area should take care of the customs, religious practices and traditional management practices of community resources. • Every village shall contain a Gram Sabha whose members are included in the electoral list for the panchayats at village level. • Planning and management of minor water bodies are entrusted to the panchayats. • The Gram Sabhas have roles and responsibilities in approving all development works in the village, identify beneficiaries, issue certificates of utilization of funds; powers to control institutions and functionaries in all social sectors and local plans. • Every Gram Sabha to safeguard and preserve the traditions and customs of people, their cultural identity, community resources and the customary mode of dispute resolution	

3.2 ADB safeguards and compliance

The project has been planned and initiated in line with the requirement of ADB safeguards. A brief description of safeguard requirement and project details is given in table below:

ADB Policy	Objective	Project Details
ADB'S SAFEGUARD POLICY STATEMENT (2009)	ADB's safeguard policy framework consists of three Operational policies on the Environment, Indigenous Peoples and Involuntary Resettlement.	

ADB Policy	Objective	Project Details
	Environmental Safeguards: To ensure the environmental soundness and sustainability of projects and to support the integration of environmental considerations into the project decision-making process.	The present ESIA study encompasses identification of environmental sensitivity and potential risks to physical, biological, socioeconomic (including impacts on livelihood through environmental media, health and safety, vulnerable groups, and gender issues), and physical cultural resources in the context of the project's area of influence. Recommendation of environment management plan and mitigation measures.
	Involuntary Resettlement Safeguards To avoid involuntary resettlement wherever possible; to minimize involuntary resettlement by exploring project and design alternatives; to enhance, or at least restore, the livelihoods of all displaced persons in real terms relative to pre-project levels; and to improve the standards of living of the displaced poor and other vulnerable groups.	Land purchase was devoid of structures or habitation. The private land is being purchased through negotiations on willing to sell and willing to buy basis. The land rates paid are more than the government rates.
	Indigenous Peoples Safeguards To design and implement projects in a way that fosters full respect for Indigenous Peoples' identity, dignity, human rights, livelihood systems, and cultural uniqueness as defined by the Indigenous Peoples themselves so that they (i) receive culturally appropriate social and economic benefits, (ii) do not suffer adverse impacts as a result of projects, and (iii) can participate actively in projects that affect them.	There is no adverse impact due to the project on indigenous people. The villages from where land were purchased does not have any scheduled tribe. Only private land has been procured for this project. All the land owners have been discussed and price paid was mutually agreed.
ADB Policy on Gender and Development (GAD)	Requires Projects to consider gender issues in all aspects of ADB operations, accompanied by efforts to encourage women's participation in the decision-making process in development activities.	The project will follow ADB Policy on Gender Development. Participation of women workers will also be ensured wherever possible in the project. Additionally, women empowerment will also be a part of CSR activities.
ADB's Social Protection Strategy (2001)	The Social Protection Strategy requires that Projects comply with applicable labour laws, and take the following measures to comply with the core labour standards for the ADB financed portion of the Project: a) carry out its activities consistent with the intent of ensuring legally permissible equal opportunity fair treatment and non-discrimination in relation to recruitment, compensation, working conditions and terms of employment for its workers b) not restrict its workers from developing a legally permissible means of expressing their grievances and protecting their rights regarding working conditions and terms of employment;	Renew Power has developed ESMS in line with the requirement of ADB's Social Protection Strategy (2001). This ESMS is applicable on all the projects initiated by Renew Power

ADB Policy	Objective	Project Details
	c) Engage contractors and other providers of goods and services: i. who do not employ child labour or forced labour; ii. who have appropriate management systems that will allow them to operate in a manner which is consistent with the intent of points (a) and (b).	
ADB policy on Public Communication policy	ADB shall ensure that the project or program design allows for stakeholder feedback during implementation. ADB shall ensure that relevant information about major changes to project scope and likely impacts is also shared with affected people and other interested stakeholders. The borrower and/or client shall provide relevant environmental, resettlement, and indigenous people's information, including information from the documents referred such as EIA, IEE etc to affected people in a timely manner, in an accessible place, and in a form and language(s) understandable to them.	It is recommended to hold a meeting with Village Sarpanch and other people to disclose the project and taking their view. To receive the comments of villagers and other stakeholder, arrangement will be made under grievance redressal mechanism. This mechanism not only facilitate receiving of stakeholder's concern but also help to address the comment in time bound manner. Renew Saur Shakti Private Limited (RSSPL) believe in clear and thorough communication with the community during the project life cycle and the same will be implemented. Public Disclosure will be made in time after all the land procurement finalised at all the villages.
ADB policies on 2010 on Gender mainstreaming guidelines	ADB's Policy on Gender and Development will adopt mainstreaming as a key strategy in promoting gender equity. Gender considerations shall be mainstreamed into all ADB activities, including macroeconomic and sec-tor work, and lending and technical assistance (TA) operations. The key elements of ADB's policy will include gender sensitivity, gender analysis, gender planning, mainstreaming, and agenda setting. Focus on Developing member countries	Not Applicable. Renew Power through CSR interventions will work with women/girl child on key thematic areas such as Education, Health and Empowerment.
ADB policies on participation guides	Participation in ADB-assisted operations refers to the processes through which stakeholders influence or contribute to designing, implementing, and monitoring a development activity. Participation, rather than merely a goal in itself, helps achieve improved development results. By ensuring stakeholders understand and can participate in the decisions, resource allocations, and activities that affect their lives, it ensures attainment of the benefits from this engagement.	Stakeholder participation in this project has been ensured through stakeholder discussion and project disclosure. Further, CSR program will also be prepared in line with the discussion held with community.

3.3 ADB Prohibited Investment Activities List (PIAL)

The proposed project has been assessed with the ADB prohibited investment activities list and found that it does not fall under this list.

List:

The following do not qualify for Asian Development Bank financing:

i. Production or activities involving harmful or exploitative forms of forced labor[3] or child labor[4];

ii. Production of or trade in any product or activity deemed illegal under host country laws or regulations or international conventions and agreements or subject to international phaseouts or bans, such as (a) pharmaceuticals[5], pesticides, and herbicides[6], (b) ozone-depleting substances[7], (c) polychlorinated biphenyls[8] and other hazardous chemicals[9], (d) wildlife or wildlife products regulated under the Convention on International Trade in Endangered Species of Wild Fauna and Flora[10],and (e) transboundary trade in waste or waste products[11];

iii. Production of or trade in weapons and munitions, including paramilitary materials;

iv. Production of or trade in alcoholic beverages, excluding beer and wine[12];

v. production of or trade in tobacco;[10]

vi. Gambling, casinos, and equivalent enterprises; [10]

vii. production of or trade in radioactive materials[13], including nuclear reactors and components thereof;

viii. production of, trade in, or use of unbonded asbestos fibres[14];

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[3] Forced labor means all work or services not voluntarily performed, that is, extracted from individuals under threat of force or penalty.

[4] 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).

[5] A list of pharmaceutical products subject to phaseouts or bans is available at http://www.who.int.

[6] A list of pesticides and herbicides subject to phaseouts or bans is available at http://www.pic.int.

[7] A list of the chemical compounds that react with and deplete stratospheric ozone resulting in the widely publicized ozone holes is listed in the Montreal Protocol, together with target reduction and phaseout dates. Information is available at http://www.unep.org/ozone/montreal.shtml.

[8] *A group of highly toxic chemicals, polychlorinated biphenyls are likely to be found in oil-filled electrical transformers, capacitors, and switchgear dating from 1950 to 1985.*

[9] *A list of hazardous chemicals is available at http://www.pic.int.*

[10] A list is available at http://www.cites.org.

[11] As defined by the Basel Convention; see http://www.basel.int.

[12] This does not apply to project sponsors who are not substantially involved in these activities. Not substantially involved means that the activity concerned is ancillary to a project sponsor's primary operations

[13] *This does not apply to the purchase of medical equipment, quality control (measurement) equipment, and any equipment for which ADB considers the radioactive source to be trivial and adequately shielded.*

[14] *This does not apply to the purchase and use of bonded asbestos cement sheeting where the asbestos content is less than 20%.*

ix. commercial logging operations or the purchase of logging equipment for use in primary tropical moist forests or old-growth forests; and

x. marine and coastal fishing practices, such as large-scale pelagic drift net fishing and fine mesh net fishing, harmful to vulnerable and protected species in large numbers and damaging to marine biodiversity and habitats.

The project i.e. development of solar power asset does not fall into any of the PIAL as described above

3.4 Social and Environmental Performance Standards of the International Finance Corporation

The International Finance Corporation has laid down a set of eight Performance Standards that the project developers need to comply with while establishing the project. The provisions of the Performance Standards relevant to the solar power projects are summarized below:

Table 3-2: IFC's Environmental and Social Performance Standards

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
PS 1: Social and Environmental Assessment and Management Systems	Conduct an Environmental and Social Impact Assessment (ESIA) of the project, appropriate to the nature of the project's environmental and social risks and potential impacts.	Arcadis has been appointed by Renew Power to undertake ESIA study to identify the environment and social risks that may arise due to the solar power project and recommend mitigation measures for the same as provided in **Chapter 6** The PS 1 is applicable to projects with environment and/or social risks and/or impacts. The proposed project is a solar power project and will have environmental and social impacts resulting from loss of agricultural/grazing land, generation of noise, construction activities etc. ***PS 1 is therefore applicable for the proposed project.***	Renew Power has developed an Environmental and Social Management System at the corporate level as well as adhere to the environment and social management plan recommended for its solar project at the ground level. Renew Power is required to fulfil the following requirements: • Environmental and social action plan; • Identification of risks and impacts; • Management program; • Organizational capacity and competency; • Training for security and safety workers; • Emergency preparedness and response; • Stakeholder engagement/ grievance redressal; and • Monitoring, reporting and review.
	Establish Environmental and Social Management Plans commensurate with the findings of the ESIA and consultation with affected communities	An Environmental and Social Management Plan has been prepared and incorporated in Chapter 7 of the ESIA report taking into consideration the potential social and environmental impacts or risks already identified & assessed in ESIA.	
	Establish Action Plans where specific mitigation measures and actions are required for the project to comply with applicable laws, regulations and the requirements of these Performance Standards	An ESMP has been prepared and incorporated in Chapter 7 of the ESIA report for implementation of mitigation measures in compliance with the statutory requirements and Performance Standards	

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
	Provide organizational capacity and contractor / employee training to enable project to achieve continuous environmental and social performance	Organizational structure with roles and responsibilities of the team within the organization is defined in Chapter 2.	
	Establish and maintain a timely process of community engagement, including a grievance mechanism, focusing on disclosure of information and consultation with local communities affected by project risks or adverse impacts that is free from external manipulation, interference or coercion to ensure relevant and understandable access to project information.	A community engagement plan needs to be developed and implemented as well as adequate reporting needs to be done. This should aim to inform the community project related adverse impacts or risks. The grievance redresses mechanism has been developed in ESIA	
	Establish procedures to monitor and measure the effectiveness of the environmental and social management program, including internal reporting of the program's effectiveness to the project's senior management, disclosure of Action Plans (including material changes to such Plans) to affected communities, and external reporting to affected communities on the results of Action Plans, commensurate with the concerns of the affected communities	System of monitoring with periodic audits will be established at all the sites of said Project spread in three villages viz. Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal of Medak district.	
PS 2: Labour and Working Conditions		The PS 2 applies to workers directly engaged by the client (direct workers), workers engaged through third parties (contracted workers), as well as workers engaged by the client's primary suppliers (supply chain workers). The proposed project involves employment of direct and contracted workers during construction and operation phases. Locals will be hired to carry out unskilled work.	RSSPL through its contractors (Sterling & Wilson as EPC contractor for this project) should ensure that adequate facilities and amenities are provided in the labour accommodation for the migrant workers (20%) including: adequate living/sleeping facilities and space per person; potable water that meets national standards and standards as laid down by ILO; toilets, washing and cleaning facilities; canteen/mess or fuel for cooking; locker/storage facilities; and facilities for management and disposal of garbage, sewage and other waste. The

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
		PS 2 is therefore applicable for the proposed project.	company will periodically review and monitor the condition of the accommodation given to workers. The worker accommodation standards as laid down by ILO is presented in **Appendix C** of the document. The company, as a part of the contractor should regularly monitor compliance to the aforesaid guidelines/requirements and ensure that these are met. Internal audits and follow up on corrective actions will also need to be undertaken to assess efficacy of the oversight system. No labour camps were established during site visit, as the project was in its initial phase and construction work was not initiated at any site.
	Establishment of a Human Resources Policy consistent with the requirements of this Standard that informs employees of their rights under national labour and employment laws		The contractors should have well framed HR policies. The workers/labours engaged by the contractors should be informed about their rights under national labour and employment laws.
	Document and communicate to all employees' conditions and terms of employment.	Applicable during construction and operation phase	RSSPL will engage labours through contractors (Sterling and Wilson as EPC contractor), however the same should be supervised so that the engagement of workers is in accordance to applicable rules and regulations. RSSPL through contractor (Sterling and Wilson) will ensure adequate provisions of facilities such as access to clean water, sanitary facilities and other necessary facilities at the labour camps and construction sites.
	Practice non-discrimination and equal opportunity in making employment decisions	Applicable during construction phase	Need to be complied. Equal opportunity should be given to both men and women depending on their skills and capacity wages, work hours and other benefits should be as per the national labour and employment Laws at all the project sites viz. at Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal of Medak district.
	Provide a mechanism for workers to raise workplace concerns.	Applicable during construction and operation phase	Grievance Redressal Mechanism (GRM) has been framed under the ESMS and the same will be implemented at project level.

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
			This is applicable both during construction and operation phase and should be supervised by RSSPL.
	Provide workers with a safe and healthy work environment, taking into account risks inherent to the particular project sector	Applicable during construction and operation phase	RSSPL or their contractor should follow its EHS policy while operating onsite. In absence of EHS policy of contractor, EHS policies of ReNew Power will be applicable. RSSPL or their contractor should appoint an EHS manager onsite, who has well defined roles and responsibilities at all the solar power sites viz. at Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal of Medak district.
PS 3: Resource Efficiency & Pollution Prevention		The PS-3 is applicable to projects resulting in increased levels of pollution and requires project to avoid, minimize, or reduce adverse impacts on human health and environment by adopting pollution preventive and control technologies throughout the Project life cycle. The proposed project is a clean energy project and will not have major pollution sources associated with it. The construction works for the development of project will result in generation of wastes like wastewater, waste oil and construction debris .The operation phase will result in noise emissions and generation of minor quantities of waste such as transformer oil. ***PS 3 is therefore applicable for the proposed project.***	Water for project construction phase will be sourced via borewells (already dug by farmers/land owners). Permission from the Village Panchayat shall be taken prior to using the borewell. Drinking water supply will be met by local tankers. The project, is expected to contribute to significant GHG avoidance beginning in FY2017-18. No material impact on ambient air quality is expected on account of this project. However, temporary impacts on ambient air quality and noise levels may be expected during construction. Renew Power should implement measures during construction: for management of excavated earth and construction rubble; and minimization of fugitive dust emissions. Further, Renew Power should ensure through its contractors that other wastes (packing material, metal, debris, cement bags, drums/cardboards etc.) are collected, stored and disposed to re-users or in appropriate authorized debris disposal areas. Limited concreting work is expected for structure foundations, sub-station, and transmission towers. Cement concrete mixers will be expected to be used at site since significant concreting work is not expected. Concreting and other construction activities including use of earth moving equipment and increased traffic for material movement is expected to result in increase in ambient noise levels. However, this increase is short term

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
			during construction stage only. The construction work will be carried out only during day time and no noise generating equipment will be operated at night. No material impact on surface or groundwater resources is expected on account of the project, except that the water sourcing requirement during the construction phase will need to safeguard the immediate and medium term needs of water by the local communities. The sub-contractors should ensure that the water made available to workers and employees' meets national potable water quality norms. The project site if equipped with appropriate facilities for collection, treatment and disposal of sewage (septic tank and soak pit) which is used both during construction and operation phases should be provided.
	The project proponent should ensure that adequate control techniques are provided to minimize emissions or achieve a pre-established performance level and minimize pollution from project activities. The client will avoid the release of pollutants or, when avoidance is not feasible, minimize and/or control the intensity and mass flow of their release.	During the construction phase, the vehicles involved for hauling of equipment's and materials to the project site may increase the pollution level and dust in the air.	Renew Power through its contractors will ensures sprinkling of water to reduce dust in the air. Besides, Renew Power should also ensure use of vehicles having valid PUC certificates.
	The client will implement technically and financially feasible and cost effective measures for improving efficiency in its consumption of energy, water, as well as other resources and material inputs, with a focus on areas that are considered core business activities.	During construction and operation phase.	Renew Power should plan and implement pollution control measures. Practices like minimal release of waste, safe disposal of waste, wastewater management etc. should be considered prior to each phase.
PS 4: Community Health, Safety and Security		This Performance Standard is applicable to projects which entail potential risks and impacts to the health and safety of affected communities from project activities. The	The Applicability will be limited to construction period with movement of heavy machinery / vehicles. Unskilled labour and security staff should be engaged from local community. Renew Power through its contractors will try

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
		proposed project will involve transportation of components such as mounting structures, electrical equipment's, solar modules, which may pose safety risks to the local communities. **<u>The PS 4 is therefore applicable for the proposed project.</u>**	to engage maximum workers from the neighbouring villages. It should be ensured by Renew Power that the subcontractors use vehicles having valid PUC certificate. Proper signage's should be provided along the access road and project site indicating –Construction in process and other safety alarm signs.
	Evaluation of risks and impacts of the project on health & safety of the affected community during the project lifecycle and establish preventive/mitigation measures to reduce/ minimize the impacts. Disclosure of action plans to affected community and the government agency.	During Construction Phase	The potential occupational hazards arising from the project activities and the impacts on health & safety of the affected community have been identified and assessed in Chapter 6 of ESIA.
	Design, construct, operate and decommission of Structural elements or components in accordance with good industrial practice to reduce impact on community health & safety.	During Construction Phase	An occupation health safety plan has been formulated (Chapter 7) of this report. All steps to reduce the impact on the health and safety of the community to minimal will be taken.
	Minimization of impacts on the health and safety of the community caused by natural hazards that could arise from the land use changes due to project activities.	During Construction Phase and Operational phase	A management plan has been formulated as part of ESIA process to address the issue.
	Prevent or minimize the potentials for community exposure to communicable diseases during project activities	During Construction Phase	CSR Plan and activities has been provided as a part of ESIA.
PS 5: Land Acquisition and Involuntary Resettlement	PS 5 is applicable when there is physical and/or economic displacement due to acquisition of land for the project. This PS does not apply to resettlement resulting from voluntary land transactions (i.e. market transactions in	***<u>PS5 is not applicable for this proposed project.</u>***	Under the proposed project, locations fall on private land and this has not resulted in any involuntary resettlement issue as the land taken on willing to sale willing to buy basis at all the Project sites viz. Korampally, Yelakurthy and Salojipally village in Tekmal Mandal of Medak District. Lands taken are either Agricultural or Fallow Lands. The cultivation in the agricultural lands depends on both rain-

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
	which the seller is not obliged to sell and the buyer cannot resort to expropriation or other compulsory procedures if negotiation fails). The impacts arising from such transactions should be dealt with as under PS1, though sometimes, when risks are identified, the project proponent may decide to adhere to PS 5 requirement even in willing-buyer-seller cases		fall and irrigation and is without any habitation at any of the sites. Tekmal Mandal falls in the safe zone as per the CGWB report for Medak district, 2013. Moreover it was said by the land owners in all the project area villages during consultations, that due to the escalating cost in cultivation and rising labour cost, profit from Agriculture is gradually declining. More the need for money is also increasing for children's education purpose or marriage etc. Hence, the farmers are looking for more ensured profiting and supporting options. Land has been procured on willing to sell and willing to buy basis. This was confirmed on the basis of consultation with representative of the Project Proponent, land owners, consultation with land aggregator etc.
	Avoidance or at least minimization of involuntary resettlement by exploring alternative project designs balancing environmental, social and economic costs and benefits; and by acquiring land through negotiated Settlements.	Not applicable	No resettlement of people is required.
	Compensation and benefits for displaced person as per Performance Standard	Not applicable	No locals has been displaced. Price given to the land owners were decided after mutual discussion and consent. The price paid to the land owners were above than the Circle rate.
	Disclosure of all relevant information and consultation with affected persons and communities in decision making process related to resettlement.	Not applicable	No resettlement has taken place due to the project activity.
	Establish a grievance mechanism to record and resolve communities' concerns and grievances about the relocation and compensation	During the construction and operation phase	Grievance redressal mechanism is already in place with ReNew Power and the same will be implemented at project level.
PS 6: Biodiversity Conservation and Sustainable	As a matter of priority, the client should seek to avoid impacts on biodiversity and ecosystem services. When avoidance of impacts is not possible,	The applicability of this PS should be established in ecology and biodiversity section of the ESIA. Implementation of the actions necessary to meet the	Land taken for the project represent modified habitat. Further, Protected Area (N.P; WLS, Biosphere Reserve etc.) and Important Bird areas do not exist within 10km study area.

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
Management of Living Natural Resources	measures to minimize impacts and restore biodiversity and ecosystem services should be implemented. Given the complexity in predicting project impacts on biodiversity and ecosystem services over the long term, the client should adopt a practice of adaptive management in which the implementation of mitigation and management measures are responsive to changing conditions and the results of monitoring throughout the project's lifecycle.	requirements of this PS should be managed through the Management Plan. The operation phase of the proposed Project should ensure protection of local flora and fauna of the site and its surrounding. ***PS6 is applicable to the project***	
PS 7: Indigenous Peoples	Performance Standard 7 recognizes that Indigenous Peoples, as social groups with identities that are distinct from mainstream groups in national societies, are often among the most marginalized and vulnerable segments of the population. Indigenous Peoples are particularly vulnerable if their lands and resources are transformed, encroached upon, or significantly degraded. Their languages, cultures, religions, spiritual beliefs, and institutions may also come under threat. As a consequence, Indigenous Peoples may be more vulnerable to the adverse impacts associated with project development than non-indigenous communities	Not Applicable	There are no indigenous people present within the study area.
PS 8: Cultural Heritage –	Performance Standard 8 recognizes the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure	This PS is applicable when tangible forms of cultural heritage, unique natural features or tangible objects that embody cultural values and certain instances of intangible forms of culture are impacted or are proposed to be used for commercial purposes.	Chance find Procedure to be formulated in case of discovery nearby project site of any artefacts and Cultural heritage in the future. As the said Fort goes back to Sultanate Period and as same kind of such instances are evident in different areas of the District, as per the Archaeological Survey of India List as given **Table 4.22,** Chance Find Procedure could

Title of Performance Standard	Performance Standard (PS) requirements in brief	Applicability to project (Compliance)	Actions Taken/Requirements
	that clients protect cultural heritage in the course of their project activities. In addition, the requirements of this Performance Standard on a project's use of cultural heritage are based in part on standards set by the Convention on Biological Diversity.	No notified cultural Heritage is located near the project areas in any of the projects sites at Korampally, Yelakurthy and Salojipally villages respectively located in Tekmal Mandal of Medak district. **Hence, PS8 is not applicable.** However, one fort like Structure is found to be located on Sangareddy- Medak Road at Andole village under Andole Mandal of Medak District about 16.23 Km. south from the Project Area. It was reported by the local people that same sort of two more structures are located within the village. There is one Watch Tower like structure is also found adjacent to the fort like structure. It was informed by the local people that the structure was said to be built by a local chieftain namely ***Queen Shankaramma***, approximately on 1712 AD.	be formulated under PS 8 of IFC to ensure whether alike remnants of old civilization similar to the Fort are possible to be unearthed within the close proximity of the Project Area. Though, no such evidential proof was found in the site area villages, viz. Korampally, Yelakurthy and Salojipally.

3.5 Categorization of Projects as per ADB Guidelines

3.5.1 Environment

Proposed projects are screened according to type, location, scale, and sensitivity and the magnitude of their potential environmental impacts, including direct, indirect, induced, and cumulative impacts.

Projects are classified into the following four categories:

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.

Category FI. A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities have minimal or no environmental impacts or risks.

Analysis of project indicates that proposed project has very limited environmental and social impacts. The major environment impact is during short termed during construction. During operation the project does not emit any significant air / water or noise emission. Hence the project is categorized as category B

3.5.2 Involuntary Resettlement

The involuntary resettlement impacts of an ADB-supported project are considered significant if 200 or more persons will be physically displaced from home or lose 10% or more of their productive or income-generating assets.

For those involving involuntary resettlement, a resettlement plan is prepared that is commensurate with the extent and degree of the impacts: the scope of physical and economic displacement and the vulnerability of the affected persons.

Projects are classified into the following four categories:

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.

Category FI. A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities are unlikely to generate involuntary impacts.

Land is purchased based on willing seller willing buyer basis. Rain fed agricultural land devoid of any habitation is purchased hence the project is categorised as category C

3.5.3 Indigenous Peoples

The impacts of an ADB-supported project on indigenous peoples is determined by assessing the magnitude of impact in terms of

- customary rights of use and access to land and natural resources;
- socioeconomic status;
- cultural and communal integrity;
- health, education, livelihood, and social security status; and
- the recognition of indigenous knowledge; and
- The level of vulnerability of the affected Indigenous Peoples community.

Projects are classified into the following four categories:

Category A. A proposed project is likely to have significant impacts on indigenous peoples. An indigenous peoples plan (IPP), including assessment of social impacts, is required.

Category B. A proposed project is likely to have limited impacts on indigenous peoples. An IPP, including assessment of social impacts, is required.

Category C. A proposed project is not expected to have impacts on indigenous peoples. No further action is required.

Category FI. A proposed project involves the investment of ADB funds to or through a financial intermediary. The financial intermediary must apply and maintain an environmental and social management system, unless all of the financial intermediary's business activities unlikely to have impacts on indigenous peoples.

The project / project affected village does not have any indigeneous people hence it is categorised as category C.

Analysis of project based on the facts given below indicates that proposed project has very limited environmental and social impacts and can be categorised as **"Category B"** as per the ADB's guidelines on Environment,. There is no involuntary resettlement due to the project activity and no impact is envisaged on indigenous people.

3.6 EHS Guidelines of IFC

IFC has issued Environmental, Health, and Safety Guidelines in 2007. The key requirements stated in the EHS guidelines have been discussed in **Table 3.3.**

Table 3-3: IFC's EHS Guidelines

S.N	Relevant Requirements as Stated in EHS Guidelines	Section in ESIA Report where Addressed
I	**ENVIRONMENTAL ATTRIBUTES**	
i	Air Emissions and Ambient Air Quality	Please refer the section on ambient air quality in Sec 4.3.1 and 6.2.1
Ii	Energy Conservation	Please refer the section on Resource Efficiency & Pollution Prevention in sec. 3.2
iii	Wastewater and Ambient Water Quality	Segregating or diverting clean water runoff to prevent it mixing with water containing high solids content, to minimize the volume of water to be treated prior to release. Refer mitigation measures for water under Table 7.1 and under section 6.2.5
iv	Water Conservation	Refer mitigation measures in Section 6.2.5 and Table 7.1
v	Hazardous Materials Management	Refer mitigation measures in Section 6.2.7 and Table 7.1
vi	Waste Management	Refer mitigation measures in Section 6.2.7 and Table 7.1
vii	Noise	Refer mitigation measures in Section 6.2.3 and Table 7.1
viii	Contaminated Land	Refer mitigation measures in Section 6.2.2 and Table 7.1
II	**OCCUPATIONAL HEALTH AND SAFETY**	
i	General Facility Design and Operation	Please refer the section on Project Design and Technology in Sec.2.4
Ii	Communication and Training	This has been provided in Section 7.1.1 as well as in Section 7.5.2 and 7.5.3.
iii	Physical/Chemical/Biological Hazards	Discussed in Section 6.2.10
iv	Personal Protective Equipment (PPE)	The logistic arrangement for the workers wrt housing space, drinking water, food has been described in Sec 2.5.5. The Occupational health and safety aspects has been mentioned in sec. 7.5.7 and Table 7.1
v	Monitoring	Please refer Section 7.2
III	**COMMUNITY HEALTH AND SAFETY**	
i	Water Quality and Availability	Please refer Section 4.2.5 and 4.2.6
Ii	Structural Safety of Project Infrastructure	Detailed in Section 2.4
iii	Life and Fire Safety (L&FS)	Discussed in Section 6.2.10 and section 7.5.1
iv	Traffic Safety	Provided in Table 7.1 as well as Sec. 7.5.8 Providing adequate road drainage based on road width, surface material, compaction, and maintenance. Vehicles should have PUC certificate. Refer mitigation measures for Transport and Traffic

S.N	Relevant Requirements as Stated in EHS Guidelines	Section in ESIA Report where Addressed
v	Transport of Hazardous Materials	Provided in Table 7.1
vi	Disease Prevention	Provided in Table 7.1
vii	Emergency Preparedness and Response	Detailed in Section 7.5.1
IV	**CONSTRUCTION AND DECOMMISSIONING**	
i	Environment	Baseline environmental conditions have been described in chapter 4.
ii	Occupational Health and Safety	The logistic arrangement for the workers w.r.t housing space, drinking water, food has been described in Sec 2.5.5. The Occupational health and safety aspects has been mentioned in sec. 7.5.7. Proper training should be given to workers working on site. Personal protective gears should also be provided to the workers.
iii	Community Health and Safety	Measures to be taken to address the Community, Health and Safety issue has been addressed in Table 7.1 and the impacts during construction phase is given in Sec. 6.2.10 and management plan given in sec. 7.5.2, 7.5.3 and 7.5.6 Preliminary modelling should be carried out to determine whether more detailed investigation is warranted. Keep stationary source of noise such as DG sets (currently used only for back up) at farthest point from the settlements. During construction phase, safety flags on the roadsides should be displayed during work in progress. The solar project site location should also be fenced/ to prohibit public access to solar power. Follow periodic Grievance Redressal Mechanism framed for site and timely register complaints if any received by locals, investigate and resolve in the best possible manner.

3.7 Equator Principles

The Equator Principles comprise of a group of ten principles adopted by the Equator Principle Financial Institutions (EPFIs) in order to ensure that the projects funded by them are developed in a manner that is socially responsible and reflect sound environmental management practices. The applicability of each of the principles with respect to proposed project is discussed below:

Table 3-4: Compliance to Equator Principles

Equator Principle	Applicability	Project Information/Application
Principle 1: Review and Categorisation	As the project is seeking financing from EPFIs, the project has to be categorized based on the magnitude of its potential impacts and risks in accordance with the environmental and social screening criteria of IFC (Exhibit I)	Based on the IFC environmental and social screening criteria the proposed solar power project is identified as a "Category B" project with potential limited adverse social or environmental impacts that are few in number, generally site-specific, largely reversible and can be readily addressed through mitigation measures
Principle 2: Social and Environmental Assessment	An Environmental and Social Assessment has to be carried out for the project that addresses relevant social and environmental impacts and risks of the proposed project (illustrative list of issues as found in Exhibit II) and also propose mitigation and management measures relevant and appropriate to the nature and scale of the proposed project.	This report presents the Environmental and Social Impacts Assessment carried out for the project. The project has not acquired any settlement land and hence does not trigger the requirement of Resettlement and Rehabilitation.
Principle 3: Applicable Social and Environmental Standards	This Principle requires the Environment and Social Assessment to refer to the applicable IFC Performance Standards and the then applicable Industry Specific EHS Guidelines including the project's overall compliance with, or justified deviation from, the respective Performance Standards and EHS Guidelines.	The ESIA report has been prepared including the requirements of IFC performance standards and EHS guidelines.
Principle 4: Action Plan and Management System	The action plan will describe and prioritise the actions needed to implement mitigation measures, corrective actions and monitoring measures necessary to manage the impacts and risks identified in the Assessment	The management plan is given in Chapters 7 of this ESIA report.
Principle 5: Consultation and Disclosure	The project affected communities are required to be consulted in a structured and culturally appropriate manner.	Undertaken during land identification and purchase directly and indirectly through Land Aggregator. Documentation to be strengthened.
Principle 6: Grievance Mechanism	Proponent is required to establish a grievance mechanism as part of the management system	Grievance redress procedure has been developed by Renew Power and the same needs to be implemented at project level. Proper complaints register should be maintained onsite. This is applicable during both construction and operation phase.
Principle 7: Independent review	An independent social or environmental expert, not directly associated with Renew Power is required to review the Assessment, action plans and consultation process documentation in order to assist EPFI's due diligence, and assess Equator Principles compliance.	Arcadis has been appointed as third party expert to assess the environment and social impact of the project as per IFC safeguards through ESIA study.

Equator Principle	Applicability	Project Information/Application
Principle 8: Covenants	The covenants would be a part of the contract documents between Renew Power and financing agency as well as contractors and technology suppliers	E&S Covenants should be embedded within the contracts drawn between Renew Power and the contractors hired for construction activities and technology providers and waste handlers. Periodic reporting to the project developers
	EPFIs will, for all Category A Projects, and as appropriate, for Category B projects, require appointment of an independent environmental and/or social expert, or require that the borrower retain qualified and experienced external experts to verify its monitoring information which would be shared with EPFIs.	Arcadis has been appointed as third party expert to assess the environment and social impact of the project as per IFC safeguards as ESIA study. The requirements of the principle are also met by adhering to requirements of PS 1
	This should be prepared by the EPFI	Based on the audit and monitoring reports submitted by independent agencies the EPFI will report the findings publicly at least once a year

4 DESCRIPTION OF ENVIRONMENT

This chapter describes the existing environmental settings of the project site and its immediate surroundings. This includes physical environment comprising air, water and land components, biological environment and socio-economic environment. Attributes of the physical environment like air, water, soil and noise quality in the block and surrounding area were assessed primarily through monitoring and analysis of samples collected from the area. Air, water, soil and noise primary monitoring was conducted by "Good Earth Enviro Care". Arcadis personnel were responsible for selecting the monitoring stations and supervision of onsite monitoring. Primary monitoring was conducted in August, 2016.

Information on geology, hydrology, prevailing natural hazards like floods, earthquakes etc. have been collected from literature reviews and authenticated information made available by Government departments. Primary surveys were carried out to understand and record the biological environment prevailing in the area and the same was verified by the forest officials and against published information and literature. The socioeconomic environment has been studied through consultations with various stakeholders within the site. Additionally, socioeconomic data have been obtained from the Census of India, 2011 reports.

4.1 Study Area

The project site for the proposed solar power project is located in three villages namely Korampally, Yelakurthy and Salojipally, Tekaml Mandal of Medak District in Telangana State. Based on the secondary information of the region, the monitoring locations were identified to obtain the representative baseline information. Monitoring stations for air and noise were selected in proximity to the project site, vehicular traffic on main and access roads, settlements also taking consideration of the wind direction. Monitoring locations for surface water quality was selected based on the drainage pattern of the area. Soil sample locations were selected based on the land use and land cover of the study area. Locations of ecological and social surveys were also selected based on site settings; in addition, special emphasis is given to areas within 500m radius of the project site, transmission towers and access roads.

4.2 Baseline Conditions

4.2.1 Climate and Meteorological Conditions

The climate of the Medak district is characterized by hot summer and generally dry weather with some pleasing showers, except during the south-west monsoon season. The year may be divided into three seasons, viz, winter season (November to February), summer season (March to May), south-west monsoon season (June-October).

Temperature: May is the hottest month with the mean daily maximum temperature of about 40°C and the mean daily minimum temperature of 26 °C. With the onset of south-west monsoon in the mid of June, the temperature decreases appreciably and the weather becomes more pleasant. December is the coolest month with mean daily maximum temperature of about 29°C and mean daily minimum temperature of about 14°C.

Rainfall: The rainfall during south-west monsoon months alone accounts for about 84% of total annual rainfall. July is the rainiest month. Average annual rainfall in the district is about 896.7mm. The rainfall in the district increases from South towards North. The five years rainfall data obtained for Medak district is presented in **Table 4.1**.

Table 4-1: Five Year Rainfall Data – Medak District

Year	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
2004	2	0.2	10	43.2	14.6	49.5	301.7	101.4	80.5	51.7	0	0
2005	75	12.5	33.3	15	0	65.4	401.7	110.5	303	168.3	0	4
2006	0	0	81.4	30.2	86.5	113.6	119.7	286.8	201.5	22.6	18.9	0
2007	0	0	0	6.6	19.1	165.2	124.4	142.5	260.4	14.1	13.5	0
2008	0	58.7	143.7	25.6	21	61.1	130.6	356.6	146.7	19.1	4.2	2

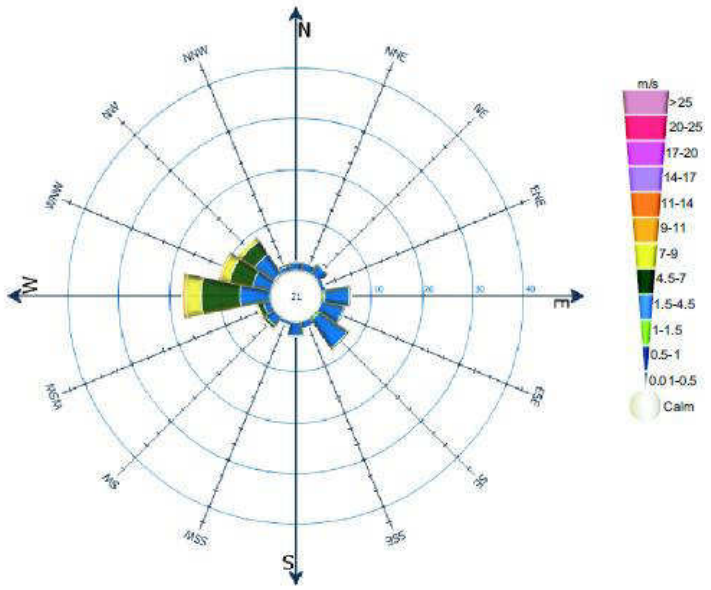
Source: IMD[15]

Relative Humidity: The relative humidity is high generally during the south-west monsoon season. The air is generally dry during the rest of the year.

Wind speed:

The annual wind rose prepared from daily surface wind data recorded for Hyderabad (nearest IMD observatory). Data indicates that 37% of the years the winds are from the west (W). The wind also blows from East (E), on 18% of the time. The wind rarely comes from the ENE and from SSW. The annual wind rose indicate that highest wind speed greater than 11 miles/second come from the westerly (W) direction.

Annual Wind Rose



Source: Indian Meteorological Department (IMD), Hyderabad

4.2.2 Topography

The topography of the project site for all the three locations is an open area with mild undulations. The elevation difference of about 10-20m is observed within the project site. Agricultural land are immediate surroundings of the project site at Korampally anf Yelakurthy site. At Salojipally site, a natural reservoir is located in the immediate vicinity. Some of the site pictures are shown in **Photo 4.1**.

[15] *www.indiawaterportal.org/sites/...org/.../imd_district-wise_rainfalldata_2004-2010.xls*

Photo 4-1: Topography of the Project Site

Korampally Site

Yelakurthy Site

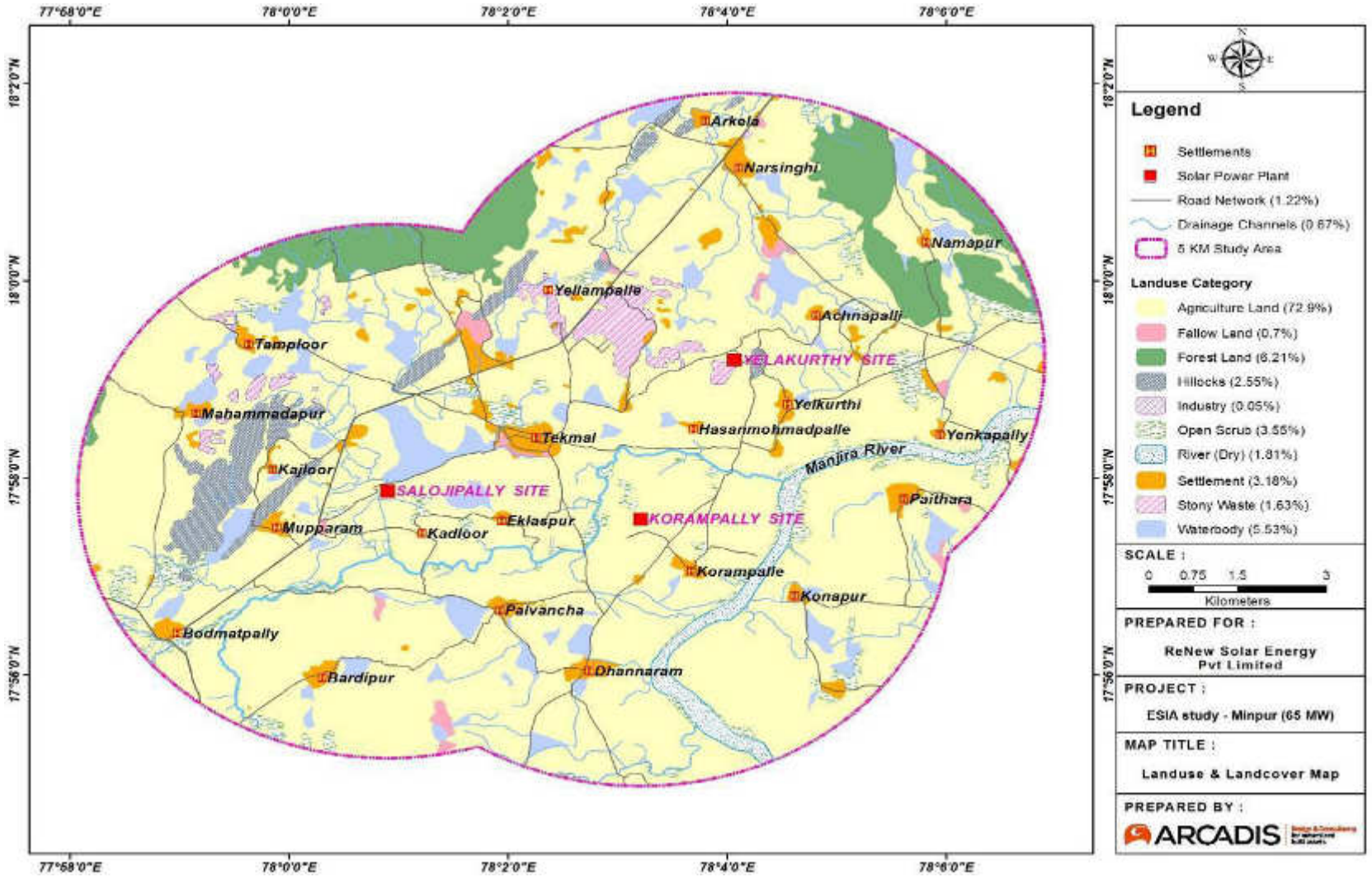
Salojipally Site

Reservoir near Salojipally Site

4.2.3 Landuse Analysis

The land-use and land-cover of the study area (10 kms) has been interpreted from visual interpretation, survey maps of the area, and subsequently by ground checking during field surveys. The land use within 5 km radius of project site represent agricultural landuse (72.9%) followed by forest land (6.21 %) and water body (5.53%), open scrub (3.55%). Settlement occupies about 3.18% while small hillocks occupies about 2.55%, dry river occupies 1.81%, stony waste land occupies 1.63%, fallow land occupies 0.7% and industry occupies 0.05% of total landuse area. Land use map showing a radius of 5 km of the project site is provided in **Figure 4.1.**

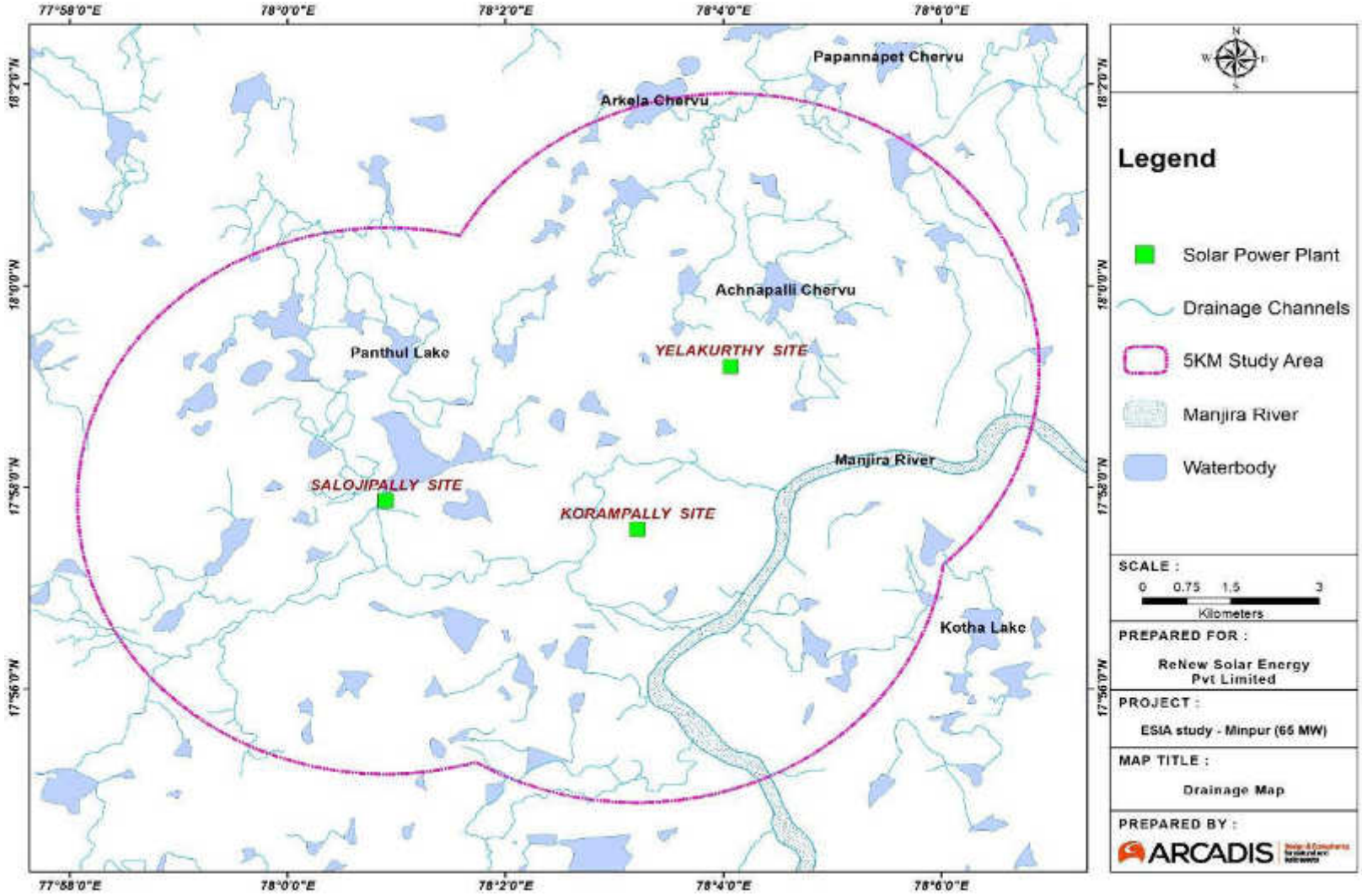
Figure 4-1: Land Use Map



4.2.4 Drainage

Major basin of Medak district is Godavari basin and minor basin is Manjira basin. Within 5 km radius of the project site, several channels originated and ultimately connected with Manjira River. With respect to our project site, natural drainages also exist which are dry and may become active in Monsoon. At korampally site manmade water storage reservoir is built close to the site. At Yelakurthy site, a canal is being constructed adjacent to the site boundary. At Salojipally site, it was observed that a natural reservoir exist near the site and a natural drainage channel passes through the site. Godavari basin is divided into 38 major watersheds. The district has one major irrigation projects namely Singur Project (drinking water project) which is being constructed across River Manjira, near Singur village. The drainage map of project site presented in **Figure 4.2.**

Figure 4-2: Drainage Map

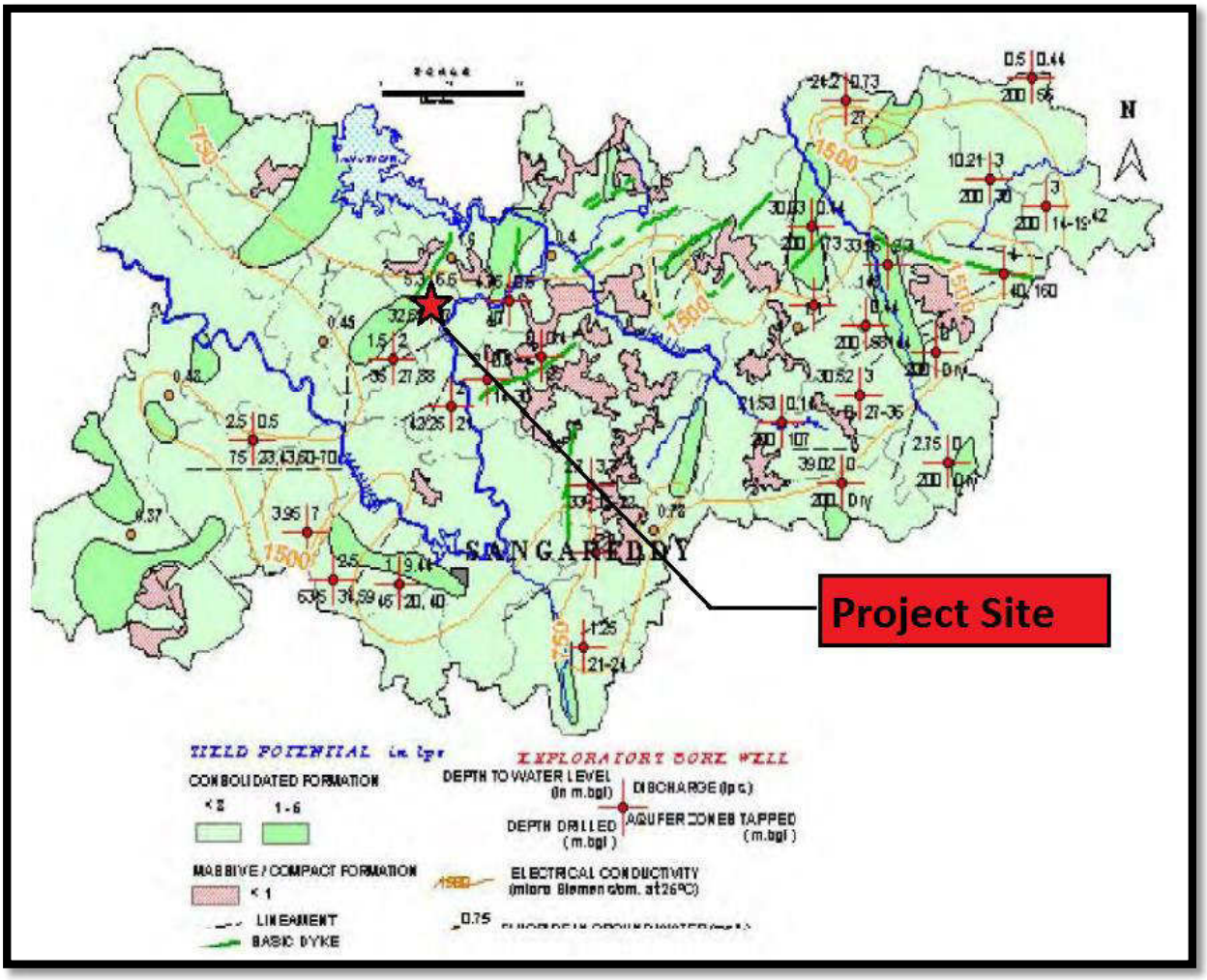


4.2.5 Hydrogeology

The entire Medak district is covered by hard rock except for 0.2% of the alluvium area[16]. Ground water occurs under unconfined to confined conditions in hard rock (Archaean and Deccan traps ages) and recent alluvial formations. The common ground water abstraction structures are dug wells, dug-cum-bore wells and bore wells and their yields mainly depending on the recharge conditions in the area. Yield potential of the aquifers in the consolidated rocks varies widely from 3 to 7 lps. In the Archaeans, ground water occurs under phreatic conditions, but it is desaturated and under semi- confined conditions in the fractured zones. The depth of weathering varies between 5.5 and 15 m bgl.

The general hydrogeological conditions of the district are depicted in **Figure 4.3**.

Figure 4-3: Hydrogeology Map of Medak District



Source: Groundwater information booklet, Medak district, CGWB

4.2.6 Ground Water Resources

The net ground water availability of Medak district is 1,05,038 ha m and utilisation is 88,700 ha m. The major water bearing formation of the district is occurs under unconfined to confined conditions in hard

[16] *Medak, CGWB (http://www.cgwb.gov.in/District_Profile/Telangana/Medak.pdf)*

rock (Archaean and Deccan traps ages) and recent alluvial formations. Based on Stage of development of ground water of the district, 23 mandals are classified as safe, 9 are semi critical and another 9 mandals are overexploited. Project site is located in Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal which is included in list of safe area by CGWB. The table below gives the groundwater availability and stage of development for Tekmal mandal versus the district in total. As per CGWB, the block/mandal has been categorised as "**safe**".

Table 4-2: Groundwater availability and stage of development (31.03.2009)

Mandal	Category of Mandal	Net Annual Ground water availability (ham)	Recharge from rainfall during monsoon season	Recharge from other sources during monsoon season	Recharge from rainfall during non-monsoon season	Recharge from other sources during non-monsoon season	Total annual ground water recharge	Provision for natural discharge	Category
Tekmal	Command	0							
	Non-Command	4279	2796	542	537	799	4674	395	Safe
	Block/Mandal Total	4279	2796	542	537	799	4674	395	Safe
	District Total	105038	67576	13329	16248	19095	116248	11210	-

Depth to Water Level: As per CGWB, the depth to water level varies from a minimum of 3.85 m.bgl (Medikonda) to a maximum of 21.00m.bgl (Kohir) in the area during the pre-monsoon period. Most of the area is having water levels below 5 mbgl. During post monsoon period, the depth to water level ranges from a minimum of 0.98 m.bgl (Peroor) to maximum of 22.65 m bgl (Melchelma). Maps showing the ground water levels pre and post monsoon is provided below.

Figure 4-4: Pre- Monsoon Depth To Water Level Map For The Project Area.

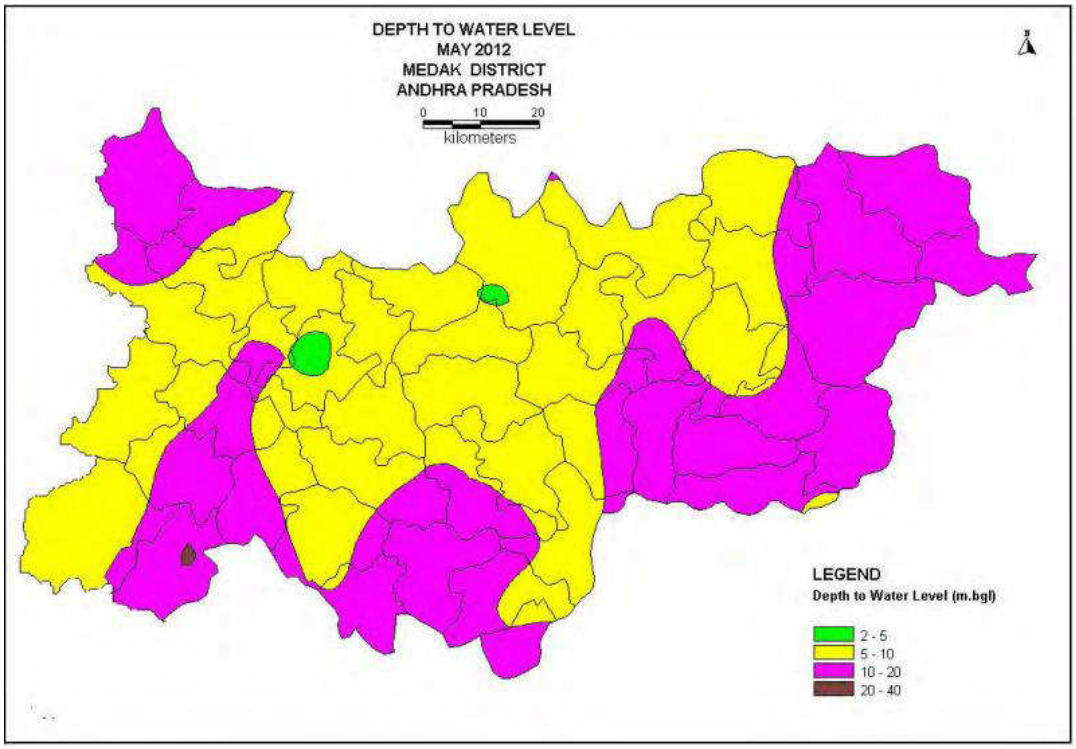
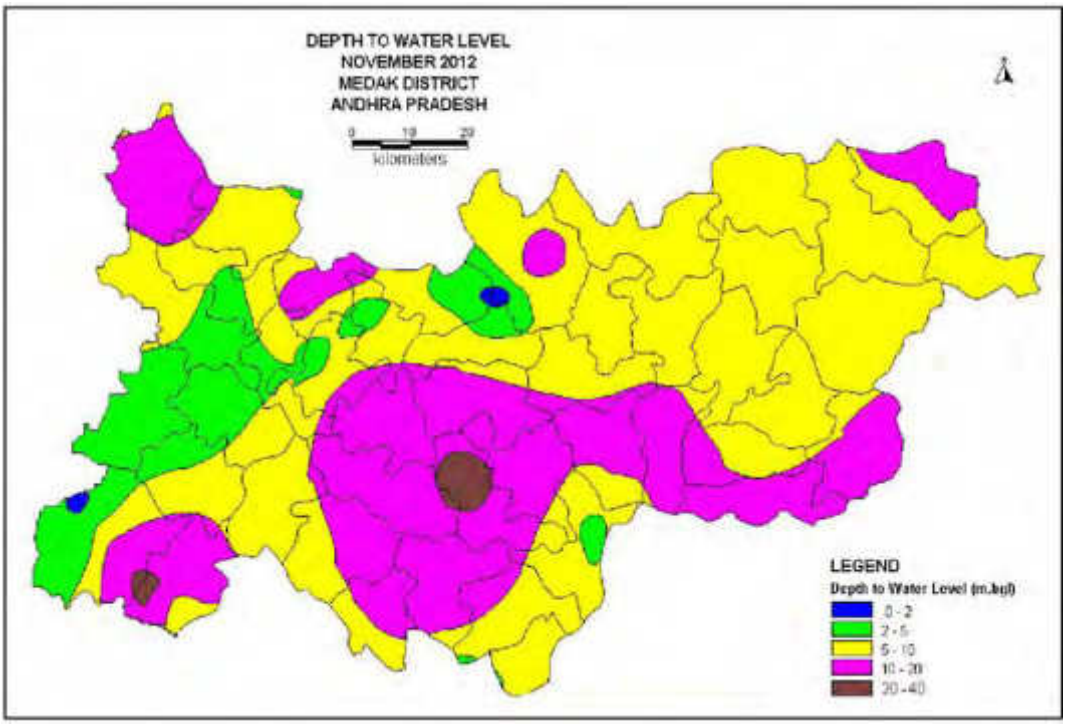


Figure 4-5: Post- Monsoon Depth to Water Level Map for the Project Area

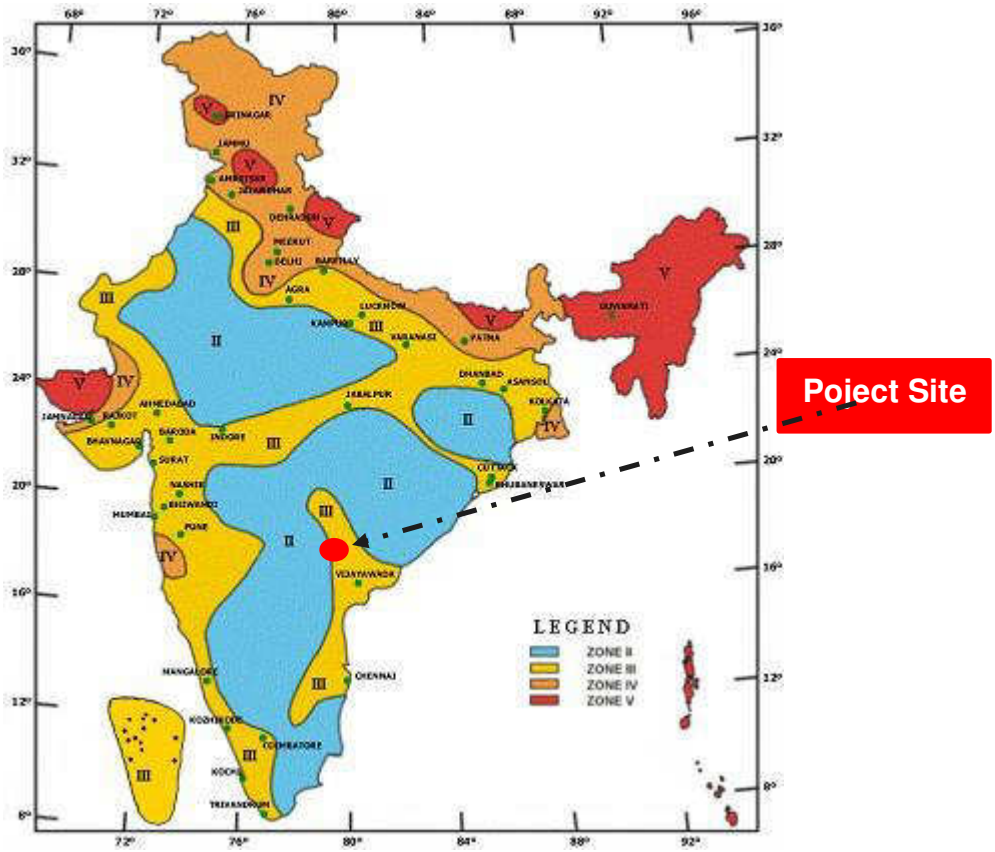


Source: District Groundwater information booklet, Medak district, CGWB, 2013

4.2.7 Seismic Hazard

The proposed project is situated in ***Zone II Low damage risk*** zone (MSK VI or less) of getting affected due to earth quakes. As such the materials used for construction of mounting structures for solar panels should have earthquake resistant properties to withstand and resist damage due to earthquakes which may lead to financial losses due to damage to the plant.

Figure 4-6: Seismic Map



4.3 Environmental Monitoring

The existing baseline conditions serves as an index for assessing the pollution load and the assimilative capacity of any region and forms an important tool for planning project activities in the area. A detailed assessment of the existing environment was undertaken for the purpose mentioned above. The monitoring locations and photographs are attached as Appendix M.

4.3.1 Ambient Air Quality

Ambient air monitoring was carried out at three locations for 24 hours (4-hourly sampling for gaseous pollutants (CO) and 8-hourly sampling for particulate matter). The monitoring was conducted for one week during the period of mid-September 2016. Monitoring stations were chosen on the basis of their proximity to settlements, topography and predominant wind direction. The details of the monitoring locations is given below in Table 4.3. Monitoring result of ambient air quality indicates that ambient air quality in the study area is good. Concentration of all the parameters monitored is found within the limits prescribed by CPCB.

Table 4-3: Ambient Air Quality Monitoring Location Details

Station Code	Location	Wind direction
AQ1	Salojipally	East to West
AQ2	Korampally	East to West
AQ3	Yelakurthy	East to West

Table 4-4: Ambient Air Quality Monitoring Results

S.No.	Parameters	Unit	Salojipally	Korampally	Yelakurthy	Specification as per CPCB
1	PM10	$\mu g/m3$	73.7	69.1	56.9	100
2	PM2.5	$\mu g/m3$	27.4	18.7	22.4	60
3	SO2	$\mu g/m3$	BDL	9.4	BDL	80
4	NO2	$\mu g/m3$	24.8	26.6	20.7	80
5	CO	$\mu g/m3$	<.2	<.2	<.2	02

4.3.2 Ambient Noise Quality

The ambient noise monitoring was conducted at three locations near each project site. The noise monitoring network was established based on the understanding of the proposed project activities and professional judgment. Sound pressure level (SPL) measurements in dB (A) were recorded for every hour continuously for 24 hours for the aforesaid monitoring station and equivalent noise levels in the form of Leq day and Leq night were computed.

Inference:

The average day time noise level ranges from 51.06- 51.66 dB (A) and average night time noise level ranges between 39.45-40.59 dB (A). It is found that day time and night time noise levels are well within the CPCB limits specified for Residential area as per Noise Pollution (Regulation and Control) Rules, 2000.

Table 4-5: Noise level monitoring results

Location Code	Location	Area Category	Daytime (Ldn) dB (A)		Night times (Ln) dB (A)	
			Results	Limits	Results	Limits
N1	Yelakurthy	Residential	51.06	55	39.45	45
N2	Korampally	Residential	53.20	55	40.3	45
N3	Salojipally	Residential	51.66	55	40.59	45

4.3.3 Surface Water Quality

Results of physical & chemical analysis of surface water samples from three locations near the project site was studied to have an idea of the quality of surface water in the study area. Monitoring results are presented in the Table 4.6.

Table 4-6 Surface Water Monitoring Results

Sl No	Parameter	Unit	Concentration		
			Yelakurthy	Korampally	Salojipally
1	pH	--	7.8	7.2	7.3
2	Electrical Conductivity (at 25°C)	µS/cm	620	677	713
3	Dissolved Oxygen (D.O)	mg/L	6.0	5.7	5.8
4	BOD (3 days at 27°C)	mg/L	2.9	2.4	2.6
5	Total Dissolved Solids	mg/L	400	430	440
6	Oil & Grease	mg/L	<5	<5	<5
7	Total Hardness (as $CaCO_3$)	mg/L	284	302	266
8	Sulphate (as SO4-2)	mg/L	40.2	32.4	41.1
9	Nitrate (as NO3-N)	mg/L	0.35	0.26	0.21
10	Fluoride(as F-)	mg/L	0.14	0.18	0.24
11	Iron (as Fe)	mg/L	0.09	0.13	0.17
12	Mercury (as Hg)	µg/L	BDL	BDL	BDL
13	Zinc (as Zn)	mg/L	BDL	0.05	0.16
14	Total Coliform	MPN/100ml	7.8	13	<1.8
15	Fecal Coliform	MPN/100ml	<1.8	<1.8	<1.8

MPN = Most Probable Number (<1.8 Means no detectable tube in the 100 ml MPN Test); BDL= Below Detection Limit (Detection Limit for Zn = 0.02mg/L, for Hg = 0.4 µg/L)

As per the CPCB classification the surface water quality falls in Class B (Outdoor bathing) as per classified use of water depending on various uses of water. The following classifications have been adopted in India.

Class Of Water	
Classification	**Type of Use**
Class A	Drinking water source without conventional treatment but after disinfection
Class B	Outdoor bathing
Class C	Drinking water source with conventional treatment followed by disinfection
Class D	Fish culture and wildlife propagation
Class E	Irrigation, industrial cooling or controlled waste disposal

4.3.4 Groundwater Quality

Results of physical & chemical analysis of ground water samples from three project locations namely Korampally, Yelakurthy and Salojipally was studied to have an idea of the quality of ground water in the study area. Monitoring results are presented in the Table 4.7. Results indicates that ground water has

higher concentration of Total hardness, chlorides, TDS, Calcium, Magnesium, Alkalinity, Faecal Coliform and Total Coliform. Concentration of these parameters are more than the prescribed limit under acceptable limit and indicates that ground water required treatment prior to the drinking.

Table 4-7: Groundwater monitoring location details

S.No.	Parameters	Unit	Yelakurthy	Korampally	Salojipally	IS:10500 Acceptable limits
1.	pH Value	-	7.4	7.6	7.1	6.5-8.5
2.	Temp.	^{0}C	30	29	28.5	Agreeable
3.	Turbidity	NTU	0.8	1.3	0.6	1
4.	Total Hardness (as $CaCO_3$)	mg/L	422	367	388	200 max.
5.	Iron (as Fe)	mg/L	0.12	0.09	0.16	0.3 max
6.	Chlorides (as Cl)	mg/L	326	296	280	250 max
7.	Fluorides (F)	mg/L	0.21	0.23	0.17	1 max
8.	Total Dissolved solids	mg/L	910	880	860	500 max
9.	Calcium (Ca)	mg/L	101	95	99	75 max
10.	Magnesium (as Mg)	mg/L	40.5	31	33.2	30 max
11.	Nitrate (as NO_3)	mg/L	1.1	0.78	1.7	45 max
12.	Copper (as Cu)	mg/L	BDL	BDL	BDL	0.05 max
13.	Mercury (as Hg)	mg/L	BDL	BDL	BDL	0.001 max
14.	Arsenic (as As)	mg/L	BDL	BDL	BDL	0.01 max
15.	Zinc (as Zn)	mg/L	0.06	0.11	0.16	5 max
16.	Alkalinity	mg/L	263	213	230	200 max
17.	Total coliform	MPN/100 ML	<1.1	<1.1	<1.1	Shall not be detectable
18.	Feacal coliform	MPN/100 ML	<1.1	<1.1	<1.1	Shall not be detectable

MPN = Most Probable Number (<1.1 Means no detectable tube in the 100 ml MPN Test)
BDL= Below Detection Limit (Detection Limit for Hg = 0.4 µg/L, As = 2 µg/L, for Cu = 0.1mg/L)

4.3.5 Soil Environment

The major soil types in the Medak District areRed loamy, sandy and black cotton soil. Red loamy soil are derived from the country rocks while black cotton soil mainly derived from basalt rock. In sedimentary formation the soils are deep upto 5 m. The major soil type in project area is black cotton soil. The soil quality support production of paddy, cotton, etc. The monitoring results presented below reflects the texture quality and type of soil present within the project site.

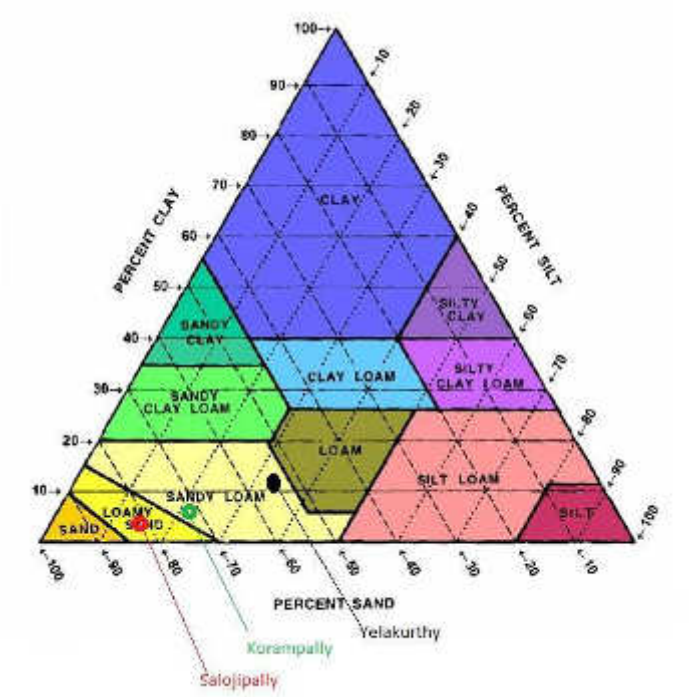
Table 4-8: Soil Monitoring Results

Sl No	Parameter	Unit	Concentration		
			Yelakurthy	Korampally	Salojapally
1	pH (1:2.5)	--	7.5	7.8	7.6

2	EC (1:2.5) (at 25^0C)	µS/cm	132	56	76
3	Colour	--	Gray	Gray	Gray
4	Sand	%	56.82	83.18	72.66
5	Silt	%	31.26	11.96	21.42
6	Clay	%	11.92	4.86	5.92
7	Available Nitrogen (as N)	mg/g	1.10	0.85	0.78
8	Available Phosphorous (as P)	mg/g	0.65	0.24	0.46
9	Available Potassium (as K)	mg/g	2.63	0.64	1.36
10	Ex. Calcium (as Ca)	mg/g	9.4	8.86	7.62
11	Ex. Magnesium (as Mg)	mg/g	2.94	2.65	2.33
12	Sodium Absorption Ratio (SAR)	--	0.05	0.04	0.04

Interpretation of Primary Soil Monitoring Results

Based on the particle size distribution obtained from the soil analysis, the texture of soil of the study area is sandy loam and loamy sand type of soil. Soil sample also contain high concentration of other minerals like calcium, magnesium and nitrogen. As per the Soil Textural Triangle (USDA), a sandy loam has on an average about 60% sand, 10% clay and 30% silt; loamy sand has about 80 % sand, 10% silt and 10% clay. Water holding capacity and nutrient holding capacity are higher for clayey textured soil than sandy textured soil while drainage is better in case of sandy soil. As the sand content in the soil is high at both the locations hence the drainage capacity of the soil is good and the soil is loose and dry.



4.4 Ecological Environment

Reconnaissance survey was conducted during mid-week of August 2016 with the aim to assess the existing ecological resources on or near the project site. The main objective of the survey was to collect ground data on flora and fauna of the area. The site surroundings were assessed to understand the biological diversity of the area. Published / unpublished secondary information was also collected on the same from government officials, journals and local residents of the area.

These information will further enable to gauge potential ecological impacts that can be generated from the project activities at the site which is located in Tekmal mandal, Medak district, Telangana. Understanding the significant risks and impacts is important to undertake mitigation measures & suggest changes, if the associated risks are huge. Such mitigation measures will help to reduce the impacts and also develop ecological monitoring parameters.

The proposed project site divided in three parcels and is located in three villages namely Korampalli, Yelakurthy and Salojipally in Tekmal mandal, district which comprises of private land mostly used for agriculture. The vegetation of the region mostly comprises of scrub lands predominated by *Azadirachta indica* (Neem), *Prosopis juliflora* (Jand) etc. According to Champion and Seth (1968) classification the Forests of Medak Division fall under Tropical Dry Deciduous & Tropical Thorn Forest types. The project site is climatologically located in dry region. The area is drained mainly by Manjeera River, a tributary of Godavari River System. Various small reservoir is located near the project site.

Pocharam Wildlife Sanctuary which is also an Important Bird Area is located is at a distance of approximately 22.08 Km North-east of the solar project site. Manjira Wildlife Sanctuary (also and Important Bird Area) is located near Sangareddy town of Medak district at a distance of approximately 33.75 km South from the project site. No identified bird area (IBA), National Parks, Wildlife Sanctuaries or established migratory path are located within 10 km from the project site.

Study Area:

The project development area and 500m around the project site was considered as the “high risk zone” or “core study area”, so it was considered as the core of the study area. For access tracks and grid connections, the survey area was considered 500m either side of the proposed limits of variation of the

route. Area within 5 km-10 km of the project site considered to be the "zone of influence" or the "buffer study area" of the project.

Main objectives for Ecological surveys:

Flora:

- Identification of floral species, endangered as well as endemic species (if any), important habitats, forests area within the study area;
- Surveys to identify local, widespread floral species, any endangered or endemic species and protected species in the study area;
- Identification of aquatic flora near the water bodies found in the study area;
- Identification of any notified area under international conventions, national or local legislation for their ecological, landscape, cultural or other related values within the study site.

Fauna:

- Identification of fauna (terrestrial, aerial and aquatic) by direct sighting and through secondary means like, nests, roosts, pug marks, droppings, etc.
- Identification and classification of species recognized as critically endangered, endangered, threatened etc. as per IUCN Red list and scheduled species as per WPA (1972).
- Identification of areas important for breeding, foraging, resting or over wintering areas include migratory corridors/ avian migratory routes.
- Identification and assessment of aquatic fauna near the study area.

Avifauna:

The avifauna study in the project area (both core and buffer zone) was done to achieve the following objectives:

- Identification of different bird and bat habitats in the study area, estimation of bird and bat species diversity and species distribution pattern.
- To draw their IUCN status & schedule status according to Indian Wildlife Protection Act (IWPA) 1972.
- Identification of important locations such as roosting, nesting sites, migratory routes, breeding and feeding areas of species or birds that congregate in large numbers (eg. migratory birds) in the study area.
- Identification of feeding areas, water bodies and favourable areas for avian fauna.
- Impact assessment due to solar power project on avifauna.
- Formulation of mitigation measure and management plan to reduce the impact.

4.4.1 Methodologies for Ecological Surveys

Flora Survey

The primary floral survey was conducted to record site specific floral species and its diversity. A walk through of the project area was carried out covering the project site and transmission route connecting the project site to GSS. Nearby area around the solar power plant site, proposed access roads and surrounding area was also covered to understand the floral diversity.

The Phytosociological analysis of the local vegetation (mainly grasses, herbs & shrubs) was conducted in or near the project site (at three locations) during the primary survey. The plots in these locations were selected randomly on the basis of similarity in vegetation component. As mentioned above, the

ground cover was predominantly covered by grass/sedges and annual herbaceous species. Tree species were sparsely distributed in the area. At each site 5 quadrats were laid (each of 5 m X 5 m) and the species were listed & recorded from each plot/quadrat. The Relative frequency, relative density, relative abundance and Important Value Index (IVI) were computed from the primary survey.

Importance Value is a measure of how dominant a species is in a given area. It is a standard tool used by biologists to inventory a forest/or any vegetation. Species diversity was also estimated as Shannon-Wiener Index following Shannon and Weaver (1963).

$H = - SUM [(pi) \times ln (pi)]$

Where, "H" is the species diversity index; "S" the total number of species; "Pi" the proportion of total sample belonging to "i"th species (i.e ni/N, n is the number of individuals of each species and N is the number of individuals of all species).

At the time of the survey, shrubs and ephemeral layer of ground flora consisting of seasonal and perennial were recorded. Woody tree species were not included in the phytosociological analysis as they were sparsely located in the area. None of the floral species recorded at site falls in the IUCN red list category.

Faunal Survey

To assess the presence of fauna in the project site, a walk through the survey area was carried out. Each project site were visited to find out the presence of faunal species in the area. The faunal survey focused mainly on three groups viz. mammals, avifauna and herpeto-fauna of the study area. The faunal survey was conducted in different parts of the study area using the existing road, paths and trails. Data related to the other faunal species were noted based on the direct sightings and from authentic secondary sources. Standard field guides was used for identification of fauna during the survey. Secondary sources like published books and reports, government departmental records, interviews with forest department and local residents were further used to gather information and support primary observations.

Habitat Survey

According to the Biogeographic provinces of India published by Wildlife Institute of India (Rodgers, Panwar and Mathur, 2002), the project site falls under the Biogeographic Province – 6D-Deccan peninsula-Central Plateau. The Biogeographic zones of India is shown in **Figure 4.7**.

The site survey also included understanding of important habitats in the area. A "Habitat" according to IFC is defined as a terrestrial, freshwater or marine geographical unit or airway that supports assemblage of living organisms and their interactions with the non-living environment. As per ADB and IFC, habitats are divided into - **Natural**, **Modified** or **Critical**[17] for the purpose of implementation of

[17] *Natural Habitats- These are the areas composed of viable assemblages of plant and/or animal species of largely native origin, and/or where human activity has not essentially modified an area's primary ecological functions and species composition.*

Modified Habitats- These are the areas that may contain large proportion of plant and/or animal species of non-native origin and/or where human activity has substantially modified an area's primary ecological functions and species composition. It may include areas managed for agriculture, forest plantations, reclaimed coastal zones and reclaimed wetlands.

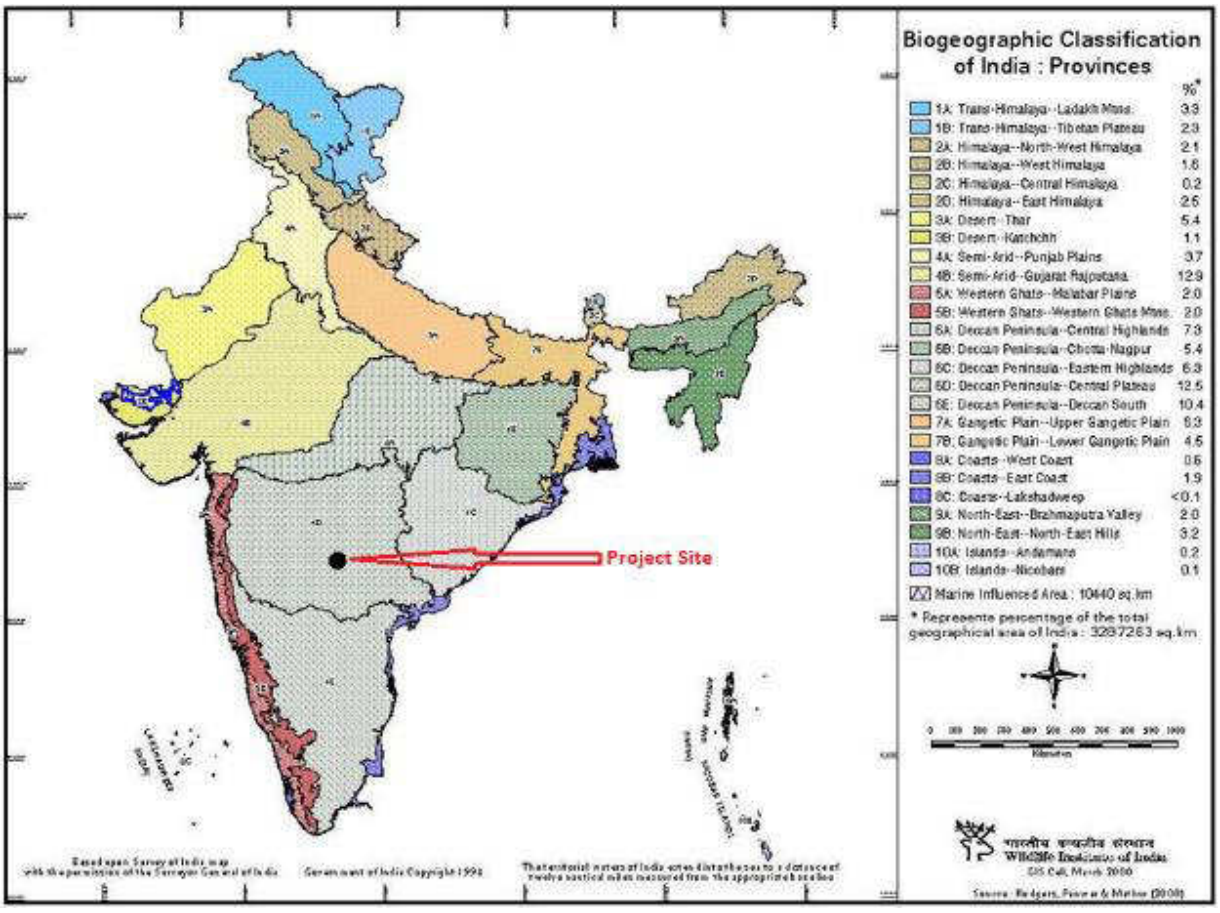
Critical Habitats- These are the areas with high biodiversity value, including (i) habitat of significant importance to critically endangered and/or endangered species; (ii) habitat of significant importance to endemic and/or restricted range species; (iii) habitat supporting globally significant concentrations of migratory species and/or congregatory species; (iv) highly threatened and/or unique ecosystems; and/or (v) areas associated with key evolutionary processes.

ADB's Environmental Safeguards18 and IFC Performance Standard-6 (Biodiversity Conservation and Sustainable Management of Living Natural Resources). Critical habitats are subsets of Natural habitats.

Based on the risks and impacts identification process, the requirements of the ADB's Environmental Safeguards are applied to projects (i) located in modified, natural, and critical habitats; (ii) that potentially impact on or are dependent on ecosystem services over which the client has direct management control or significant influence; or (iii) that include the production of living natural resources (e.g., agriculture, animal husbandry, fisheries, forestry).

During the primary survey, it was found that the habitat was primarily "Modified". The project site and nearby land was mostly agricultural land or barren agricultural land. On agricultural land paddy was being cultivated in large quantities along with other crops like toor dal, moong dal, etc. The land was also invaded by weeds or shrubs/herbs. Commonly trees like *Acacia nilotica*, *Azadirachta indica* and *Prosopis juliflora* were observed on project site. Common grasses like *Parthenium hysterophorus*, *Cynodon dactylon*, *Eleusine aegyptiaca*, *Digitaria ciliaris*, etc. were also found. It was observed that grazing was common in the area. Small parts of the agricultural land is used for grazing purposes as reported by the local people. No Reserved Forest or Protected Area is located near the project site.

Figure 4-7: Biogeographic Zones of India



4.4.2 Terrestrial Ecology

Project Site located in Tekmal mandal, Medak district is situated in the central India. The project site is located in the central Deccan peninsular region and Manjeera River, a tributary of Godavari River flows

[18] *http://www.adb.org/sites/default/files/institutional-document/33739/files/environment-safeguards-good-practices-sourcebook-draft.pdf*

east of the project site approximately 2.5 kms away. Vegetation of the project site is mainly of dry deciduous type.

Floral Profile

Flora of the proposed project site comprises of dry deciduous type vegetation. The primary floral survey was limited to record site specific floral species (mainly ephemeral layer of ground flora) and quantifying the tree species. All the three project sites were visited and site surroundings were also assessed to understand the floral diversity of the area. Trees species like *Azardirachta indica*, *Acacia nilotica*, *Acacia catechu*, etc. dominated the project area. In the villages, agricultural fields and roadside plantations species like *Azadirachta indica, Prosopis juliflora, Ficus religiosa, Prosopis cineraria, Ficus benghalensis* etc. were commonly observed.

Quantification of trees was also done for all the three site locations. At Korampally, Yelkurthy and Salojipally site, around 98, 126 & 143 trees were counted respectively. Since during the site visit, the exact boundary of the site was not available as the land purchase was under process thus there may be variations in the exact number of trees. At all the three sites, trees were sparsely distributed and mostly *Azadirachta indica* and *Acacia spp*. were found.

Such floral profile is necessary for understanding the baseline conditions of the area as the project activities might lead to loss of significant ecological resources, if present. The information will add on to the knowledge of ecological resources and help in further evaluating the possible risks due to project activities and feasibility of the proposed mitigation measures.

Floral Survey

Floral survey was conducted at three locations in namely Korampally village, Yelkurthy village and Salojipally village near the project area. Five transects were laid down at each survey locations and the ground cover was recorded. The phytosociological analysis is carried out and the results are explained below:

Korampally:

A total of 38 species of shrubs/herbs/grass were recorded during the field survey. The Phytosociological analysis is presented in the Table 4-9. The IVI of *Ipomoea alba* was found to be highest with 17.4 followed by *Digitaria ciliaris* (14.4), *Cyperus triceps* (13.8), *Martynia annua* (13.4) and Eleucine indica (13.1). Other species such as *Parthenium hysterophorus*, *Bidens alba, Cenchrus setigerus, Cynodon dactylon*, etc. were also found to be more visible and distributed.

From the above analysis, the Shanon-Wiener Index (H) is found 3.39. Typically, the Shannon index in real ecosystems ranges between 1.5 and 3.5 (MacDonald, 2003, p. 409). The index implies that as the number of species increases, or as the distribution of species becomes more even, the better the biological diversity (indicated by a larger number). Thus, the ground cover can be considered to be well diversified.

Table 4-9: Phytosociological Analysis of Herbaceous Species from the Primary Flora Survey in Korampally

Species Name	RF	RA	RD	IVI
Achyranthus aspera	3.52	2.2	3.1	8.8
Abutilon indicum	2.82	1.6	1.8	6.2
Annona squamosa	2.82	1.0	1.1	4.9
Ageratum conyzoides	3.52	1.8	2.5	7.8
Apluda mutica	3.52	2.4	3.4	9.3

Species Name	RF	RA	RD	IVI
Amaranthus viridis	3.52	1.9	2.8	8.2
Bidens alba	2.11	4.7	5.3	12.2
Sonchus asper	2.11	1.2	1.0	4.4
Aristida setacea	3.52	2.9	4.1	10.6
Ludwigia octovalvis	0.70	2.7	0.8	4.2
Borreria articularis	3.52	2.9	4.1	10.6
Calotropis procera	2.11	0.9	0.8	3.8
Cassia auriculata	2.11	1.3	1.5	4.9
Cenchrus cilliaris	3.52	2.5	3.6	9.7
Cenchrus setigerus	2.82	3.4	4.8	11.0
Saururus cernuus	2.82	5.6	4.7	13.1
Cymbopogon martini	2.11	1.0	0.9	4.0
Cynodon dactylon	3.52	3.0	4.3	10.9
Cyperus triceps	3.52	4.2	6.0	13.8
Cascabela thevetia	2.82	0.6	0.7	4.1
Digitaria ciliaris	3.52	5.9	5.0	14.4
Digitaria saunginalis	2.82	0.9	1.0	4.8
Eclipta alba	1.41	1.7	0.9	4.0
Eleucine indica	3.52	3.9	5.6	13.1
Alternanthera paronychioides	2.11	3.9	2.2	8.3
Ipomoea alba	1.41	12.4	3.5	17.4
Lantana camara	2.11	4.9	1.4	8.3
Malvastrum coromandelianum	0.70	0.3	0.3	1.3
Martynia annua	3.52	4.1	5.8	13.4
Oldenlandia spp	0.70	0.3	0.3	1.4
Parthenium hysterophorus	3.52	3.8	5.3	12.6
Prosopis juliflora	0.70	0.3	0.3	1.4
Setaria verticillata	2.82	0.8	0.9	4.4
Sida acuta	2.82	1.1	1.2	5.1
Solanum nigrum	2.11	1.9	1.6	5.7
Themeda quadrivalvis	2.82	1.7	1.9	6.4
Tridax procumbens	3.52	1.1	1.6	6.2
Zizyphus nummularia	2.82	3.2	3.6	9.6
H= 3.39				

Yelakurthy:

A total of 36 species of shrubs/herbs/grass were recorded during the field survey. The Phytosociological analysis is presented in the Table 4-10. The IVI of *Ludwigia octovalvis* was found to be highest with 17.9 followed by *Bidens alba* (17.7), *Borreria articularis* (17.6), *Cenchrus cilliaris* (16.8), *Boerhaavia diffusa* (16.2), *Lantana camara* (15.9), *Cenchrus setigerus* (14.6) and *Cascabela thevetia* (14.2). Although species such as *Apluda mutica* and *Calotropis procera* were found to be important species in

this area but the other annuals/ephemerals such as *Parthenium hysterophorus*, *Digitaria saunginalis*, *Zizyphus nummularia* etc. were also found to be more visible and distributed.

From the above analysis, the Shanon-Wiener Index (H) is found 3.29. Typically, the Shannon index in real ecosystems ranges between 1.5 and 3.5 (MacDonald, 2003, p. 409). The index implies that as the number of species increases, or as the distribution of species becomes more even, the better the biological diversity (indicated by a larger number). Thus, the ground cover can be considered to be well diversified.

Table 4-10: Phytosociological Analysis of Herbaceous Species from the Primary Flora Survey in Yelakurthy

Species Name	RF	RA	RD	IVI
Achyranthus aspera	2.90	1.1	1.1	5.1
Ageratum conyzoides	2.90	1.5	1.4	5.8
Apluda mutica	2.90	5.5	5.3	13.7
Amaranthus viridis	2.17	2.6	1.9	6.7
Bidens alba	3.62	6.4	7.7	17.7
Sonchus asper	1.45	2.2	1.1	4.0
Aristida setacea	2.90	2.6	2.5	8.0
Ludwigia octovalvis	3.62	6.5	7.8	17.9
Boerhaavia diffusa	3.62	5.7	6.8	16.2
Borreria articularis	2.90	1.8	1.8	6.5
Bothriochloa pertusa	2.17	2.0	1.4	5.6
Calotropis procera	3.62	3.6	4.4	11.6
Cenchrus biflorous	2.90	0.7	0.7	4.3
Cenchrus cilliaris	3.62	6.0	7.2	16.8
Cenchrus setigerus	3.62	5.0	6.0	14.6
Cynodon dactylon	2.90	2.5	2.4	7.7
Cyperus triceps	2.90	1.3	1.3	5.5
Cascabela thevetia	3.62	4.8	5.8	14.2
Datura metel	2.17	1.8	1.3	5.3
Digitaria ciliaris	2.17	2.8	2.0	7.0
Digitaria saunginalis	2.17	4.1	3.0	9.2
Eragrostis tennela	2.17	1.0	0.7	3.9
Euphorbia hirta	2.17	1.1	0.8	4.1
Alternanthera paronychioides	3.62	1.4	1.7	6.6
Ipomoea alba	2.17	0.7	0.5	3.3
Gloriosa superba	2.17	1.8	1.3	5.3
Lantana camara	3.62	5.6	6.7	15.9
Malvastrum coromandelianum	2.17	3.4	2.5	8.1
Martynia annua	2.90	1.8	1.8	6.5
Parthenium hysterophorus	2.90	3.7	3.5	10.1
Prosopis juliflora	2.17	1.5	1.1	4.7

Species Name	RF	RA	RD	IVI
Setaria verticillata	2.17	1.5	1.1	4.7
Saururus cernuus	2.90	1.3	1.3	5.5
Themeda quadrivalvis	2.17	1.1	0.8	4.1
Tridax procumbens	2.90	1.0	0.9	4.8
Zizyphus nummularia	2.90	2.7	2.6	8.2
H=3.29				

Salojipally:

A total of 38 species of shrubs/herbs/grass were recorded during the field survey. The Phytosociological analysis is presented in the Table 4-11. The IVI of *Cymbopogon martini* was found to be highest with 20.4 followed by *Boerhaavia diffusa* (17.2), *Cenchrus cilliaris* (16.6), *Euphorbia hirta* (16.2) and *Aristida setacea* (15.3). Other species such as *Cynodon dactylon*, *Apluda mutica*, *Cenchrus biflorous*, *Sida acuta* etc. were also found to be more visible and distributed.

From the above analysis, the Shanon-Wiener Index (H) is found 3.34. Typically, the Shannon index in real ecosystems ranges between 1.5 and 3.5 (MacDonald, 2003, p. 409). The index implies that as the number of species increases, or as the distribution of species becomes more even, the better the biological diversity (indicated by a larger number). Thus, the ground cover can be considered to be well diversified.

Table 4-11: Phytosociological Analysis of Herbaceous Species From The Primary Flora Survey in Salojipally

Species Name	RF	RA	RD	IVI
Abutilon indicum	3.68	1.3	1.6	6.6
Ageratum conyzoides	2.21	1.8	1.3	5.2
Alternanthera paronychioides	2.21	2.5	1.9	6.6
Amaranthus viridis	3.68	2.1	2.5	8.3
Apluda mutica	2.94	4.4	4.3	11.7
Aristida setacea	3.68	5.3	6.4	15.3
Bidens alba	2.94	2.0	2.0	6.9
Boerhaavia diffusa	3.68	6.1	7.4	17.2
Borreria articularis	3.68	5.8	7.1	16.6
Bothriochloa pertusa	2.94	1.2	1.2	5.3
Cascabela thevetia	3.68	2.8	3.4	9.8
Cassia auriculata	1.47	1.0	0.5	2.9
Cenchrus biflorous	2.94	3.7	3.6	10.2
Cenchrus cilliaris	3.68	5.8	7.1	16.6
Cenchrus setigerus	0.74	1.0	0.2	1.9
Cymbopogon martini	3.68	7.6	9.2	20.4
Cynodon dactylon	3.68	4.8	5.8	14.3
Cyperus triceps	1.47	2.2	1.0	4.7
Datura metel	1.47	2.4	1.2	5.0

Species Name	RF	RA	RD	IVI
Digitaria ciliaris	2.94	1.2	1.2	5.3
Digitaria saunginalis	3.68	1.5	1.9	7.1
Eclipta alba	2.21	2.5	1.9	6.6
Eleucine indica	0.74	1.0	0.2	1.9
Eragrostis tennela	3.68	1.0	1.2	5.8
Euphorbia hirta	3.68	5.6	6.8	16.2
Ipomoea alba	1.47	3.1	1.5	6.1
Lantana camara	2.21	1.1	0.8	4.1
Malvastrum coromandelianum	2.94	2.3	2.2	7.4
Martynia annua	1.47	3.6	1.7	6.8
Parthenium hysterophorus	2.94	1.1	1.0	5.1
Saururus cernuus	2.21	1.3	0.9	4.4
Setaria verticillata	2.21	2.2	1.6	6.1
Sida acuta	3.68	3.0	3.6	10.2
Sida rhombifolia	2.94	1.2	0.6	4.7
Solanum indicum	1.47	0.0	1.5	3.0
Sonchus asper	2.94	2.3	2.2	7.4
Tridax procumbens	2.21	2.4	1.7	6.3
Zizyphus nummularia	2.94	1.4	1.4	5.8
H= 3.34				

Since all the three sites are modified habitat (disturbed habitat) not much variation in the Shannon-Wiener index is observed. All of these species recorded during the site visit were common and none of the plant species recorded from the primary survey and or reported to occur in this region is listed in IUCN red data category.

Photo 4-2: Flora of the Proposed Project Area

Cassia auriculata

Sonchus asper

Annona squamosa

Setaria verticillata

Kigelia spp.

Ipomoea aquatica

Ziziphus nummularia

Azadirachta indica

Prosopis juliflora

Ficus benghalensis

Bidens alba

Ludwigia octovalvis

Parthenium hysterophorus

Lantana camara

Saururus cernuus

Cascabela thevetia

Peltophorum pterocarpum

Acacia nilotica

Alternanthera paronychioides

Ipomoea alba

Sida rhombifolia

Datura metel

Tectona grandis

Eucalyptus spp.

Gloriosa Superba

Euphorbia hirta

4.4.3 Faunal Profile

Mammal

During the walk through survey around the proposed project area, wild boar was sighted at Salojipally site. Dialogue with the locals also confirmed that wildlife species (small mammalian species) such as wild boar, deers, etc. do exist in that area. At some vegetated area, squirrel and mongoose were also sighted during the primary survey which are very common in that type of habitat. A burrow habitat have been observed in the site area which could be possibly of porcupine (*Hystrix indica*). They are the species seeking shelter in caves, between rocks, or in its burrow during the day. The burrow is usually self-constructed, with a long entrance tunnel, multiple exits and a large inner chamber.

For information, it is necessary to mention that, Pocharam Wildlife Sanctuary is located is at a distance of approximately 22.08 Km North-east of the solar project site. Common mammals found in the sanctuary are Wild Dog, Wolf, Jackal, Forest Cat, Sloth Bear, Sambar, Nilgai, Chinkara, and four horned Antelope, etc. Another Protected Area named Manjira Wildlife Sanctuary is also located near Sangareddy town of Medak district at a distance of approximately 33.75 km south from the project site. Commonly reported mammals in the sanctuary are Indian hare, wild boar, mongoose and jackal etc.

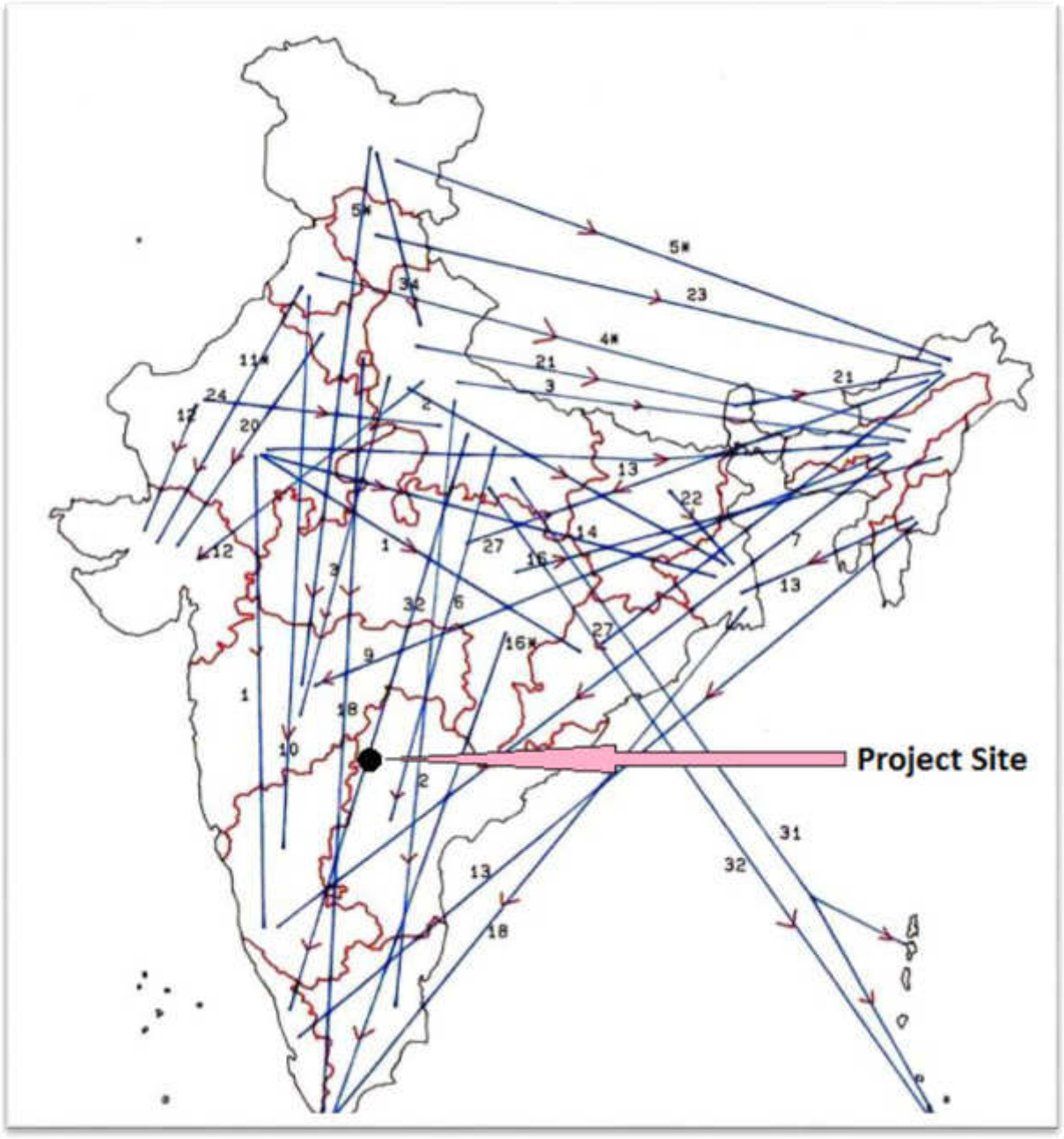
Avifauna

From the primary walkthrough survey around the proposed project site, a total of 27 species of birds were sighted and recorded. Amongst them, Egrets, black drongo, Eurasian collared and Laughing dove, red wattled lapwings were abundantly sighted near the project site. Painted Stork & Black Winged Kite, sighted during the survey fall under 'Near Threatened' category as per IUCN's Red List and in Schedule-I species category as per Wildlife (Protection) Act, 1972 respectively. Peafowls were also spotted near the project site and are reported to be commonly present in the area. Peafowls fall under Schedule-I species category as per Wildlife (Protection) Act, 1972. The species of birds recorded from the project study area during site visit is listed in the **Table 4.12** below and photo documentation of the same is shown in **Photo 4.3** of this report**.**

No Important Bird Area (IBA) is located within 10 km radius of the project site. The nearest IBA is Pocharam Wildlife sanctuary which is located around 22.08 Km North-east of the solar project site. According to a study conducted by Bopinwar S. et al , 2012[19] , the seasonal movements or migratory routes of birds like blue headed yellow wagtail and Indian booted tree warbler are located towards the north-eastern boundary of the Telangana state. The map showing the pathway is attached as **Figure 4.8**.

[19] *Bopinwar S., Zade S. B. & Gosh T.K. (2012). Seasonal Movements and Migration of Birds: Indian Scenario, Journal of Today's Biological Sciences : Research & Review (JTBSRR), Vol.1 103-121*

Figure 4-8: Migratory Routes of Birds within India



Source: Bopinwar et al. 2012

Route No.	Birds
32	Blue headed yellow wagtail
18	Indian booted tree warbler

Although no migratory bird species was recorded from the project site or nearby area, it cannot be ruled out that no migratory bird visits this area.

Table 4-12: List of Avifauna Sighted During Visit

S. No.	Common Name	Scientific Name	IUCN Status	WPA Schedule	Migratory Status
1	Black Drongo	*Dicrurus macrocercus*	LC	Schedule IV	Resident
2	Black Shouldered Kite	*Elanus axillaris*	LC	Schedule I	Resident
3	Black Winged Stilt	*Himantopus himantopus*	LC	Schedule IV	Resident/ Local migratory
4	Cattle Egret	*Bubulcus ibis*	LC	Schedule IV	Resident
5	Common Coot	*Fulica atra*	LC	Schedule IV	Resident
6	Common Myna	*Acridotheres tristis*	LC	Schedule IV	Not migratory
7	Eurasian Collared Dove	*Streptopelia decaocto*	LC	Schedule IV	Resident
8	Greater Coucal	*Centropus sinensis*	LC	Schedule IV	Resident
9	Great Egret	*Ardea alba*	LC	Schedule IV	Resident
10	Grey heron	*Ardea cinerea*	LC	Schedule IV	WV/Resident
11	House Crow	*Corvus splendens*	LC	Schedule IV	Resident
12	House sparrow	*Passer domesticus*	LC	Schedule IV	Resident
13	Indian Bushlark	*Mirafra erythroptera*	LC	Schedule IV	Resident
14	Indian Robin	*Copsychus fulicatus*	LC	Schedule IV	Resident
15	Indian Roller	*Coracias benghalensis*	LC	Schedule IV	Resident
16	Indian Silverbill	*Lonchura malabarica*	LC	Schedule IV	Resident
17	Intermediate Egret	*Ardea intermedia*	LC	Schedule IV	Resident
18	Large Grey babbler	*Turdoides malcolmi*	LC	Schedule IV	Resident
19	Laughing Dove	*Streptopelia senegalensis*	LC	Schedule IV	Resident
20	Little Egret	*Egretta garzetta*	LC	Schedule IV	Resident
21	Painted Stork	*Mycteria leucocephala*	NT	Schedule IV	Resident
22	Indian Peafowl	*Pavo cristatus*	LC	Schedule I	Resident
23	Pond heron	*Ardeola grayii*	LC	Schedule IV	Resident
24	Red vented Bulbul	*Pycnonotus cafer*	LC	Schedule IV	Resident
25	Red wattled Lapwing	*Vanellus indicus*	LC	Schedule IV	Resident
26	Rock Pigeon	*Columba livia*	LC	-	Not migratory
27	White Throated Kingfisher	*Halcyon smyrnensis*	LC	Schedule IV	Resident

LC: Least Concerned; NT: Near Threatened

Photo 4-3: Sighted Avifaunal Species

Black Winged Kite

Greater Coucal

Common Myna

Common coot

Black Winged Stilts

Red Wattled Lapwing

Painted Stork

Indian Roller

Cattle Egret

Great Egret

Intermediate Egret

Little Egret

Indian Silverbill

Indian Robin

Eurasian Collared Dove

Large Grey Babbler

Pond Heron

White Throated Kingfisher

House Crow

Laughing Dove

Back Drongo

House Sparrow

Red Vented Bulbul

Grey Heron

Indian Bushlark

Peafowl

Herpetofauna

No reptile or amphibian species was directly sighted during the study period. Although agricultural fields and bushy areas are known to be the habitat of common reptiles like garden lizard (*Calotes versicolor*), snake species like Rat snake (*Ptyas mucosus*), Common cobra (*Naja naja*) etc. Dialogue with the local people confirmed the presence of these species in and around the study area.

4.4.4 Aquatic Environment

There are small seasonal water bodies used to be filled up with storm water during monsoon are located near the project area. Manmade reservoir is present near Korampally site which is used for bathing domesticated animals or for agricultural purposes. A perennial reservoir is present very close to the boundary of Salojipally site. The water is also used for agricultural purposes.

4.5 Socio Economic Environment

This section describes the socioeconomic condition in the study area and relates the village level socioeconomic conditions with tehsil and district level. The objective of analysis of information at village, tehsil and district level is to identify the existing facilities and gaps at village level which can be considered as need of the study area.

Site visit was undertaken along with primary and secondary data collection from various sources. Primary data includes consultation with land aggregator and some land sellers who have sold land or have sale agreement. Interviews were also undertaken with Project Proponent - ReNew Saur Shakti Private Limited, local villagers and government officials. Information and Documents were collected from ReNew Saur Shakti Private Limited, project site and land details as per requirements. The assessment of socio-economic environment was carried out based on the primary survey with the help of framed questionnaire to conduct community consultation (as presented in **Appendix D**) Secondary data includes Census 2011, information available on the official website of the district of Medak, i.e. http://www.medak.telangana.gov.in/medak/, Statistical Year Book, 2015 of Telangana Govt., District Census Handbook, and other available data on official Government websites. It was designed to capture occupational patterns, societal set up, access to basic amenities and socio-economic profiling of villages and communities considering the nature of the project operations and understanding of the demographic characteristics of the area from the secondary data.

The socio economic assessment has been done based on the informations provided by ReNew Saur Shakti Private Limited like land details etc. and the outcomes of the consultation with the land sellers and other community members conducted onsite.

Telangana came to be existed as the 29th State of India after being parted from Andhra Pradesh on the 2nd of June 2014 through '*Andhra Pradesh Reorganisation Act, 2014*' passed by the Parliament of India for the formation of Telangana state comprising ten districts from north-western Andhra Pradesh.[20] The actual data regarding the population is thus cannot be produced and entire basis of Census related information will be from Census, 2011. Though the village specific data will be both from Census, 2011 and Primary Consultation.

Project Impacted / Study Area Villages

As informed by ReNew Saur Shakti Private Limited (RSSPL), the proposed 65MW Solar Power Project is spread over in three villages namely Korampally, Yelakurthy and Salojipally under Korampally, Yelakurthy and Tekmal Panchayats respectively under Tekmal Mandal in Medak district as presented in Table 4.13. As given in the DPR of the mentioned Solar Power Project the power generated by the RSSPL 65MW PV plant at 220kV shall be fed to Minpur grid substation located approximately 10-12kms from the Project site through a single circuit transmission line. The point of interconnection will be at the Minpur substation, which may be utilised for power evacuation after the Solar Power sites at Korampally, Yelakurthy and Salojipally villages become operative.

Table 4-13: List of Villages for Socio-economic Profiling

Sl. No.	State	District	Mandal/ Tehsil	Gram Panchayat	Village
1	Telangana	Medak	Tekmal	Korampally	Korampally
2				Yelakurthy	Yelakurthy
3				Tekmal	Salojipally

Source: ReNew Saur Shakti Private Limited (RSSPL), Primary Consultation and Census 2011

4.5.1 Demographic Profile

The demographic profile in terms of total population, number of households, household size and sex-ratio of the selected villages surveyed in study area are discussed in the section below.

Population and sex ratio

State: As per details from Census 2011 and also given in Statistical Year Book, 2015 of Directorate of Economics and Statistics, Government of Telangana, the total population of Telangana is 35,193,978 which includes 1,77,04078 male and 1,74,89900 female. Sex Ratio in Telangana is 988[21] female per 1000 male, which is above the national average of 940 as per census 2011. As enumerated in Census, 2011 Literacy rate in Telangana is 66.54% of that, Male literacy and female literacy are 75.04% and 57.99%, respectively. The overall growth of total population during the decade 2001 to 2011 is 13.58%, whereas it was 18.77% in the preceding decade.[22]

Medak District: Medak was formerly popular as Siddapur Medak, the prefix however, lost its importance in the popular usage. It is located in Telangana State. Sangareddy is the district headquarters of Medak. The district was situated between 77° 28' and 79° 10'E, of the eastern longitudes and 17° 23' and 18° 19'N, of northern latitudes with a total area of 9,699 Sq. Km. The district is bounded by Nizamabad District to the north, Hyderabad District to the east and south, Warangal and Nalgonda Districts to the east, and Karnataka state to the west. As per the district website portal of

[20] *Statistical Year Book, 2015 of Directorate of Economics and Statistics, Government of Telangana*

[21] *http://www.telangana.gov.in/About/State-Profile and Census, 2011*

[22] *Statistical Year Book, 2015 of Directorate of Economics and Statistics, Government of Telangana*

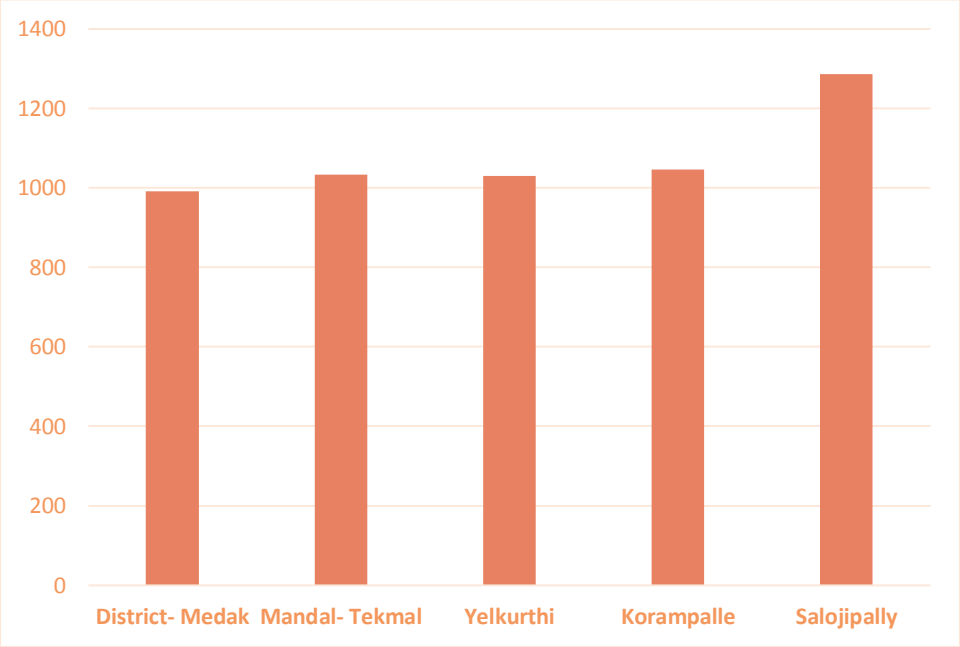
Medak district[23] and also Census, 2011 the district has population of 30,33,288 which accounts for 8.62% of the total population of the State. Among the total population of the District 15, 23,030 are male and 15, 10,258 female. The sex ratio of Medak district is 992.

Tekmal Mandal: The 3 study area villages of the present 65 MW Solar Power Plant, namely Korampally, Yelakurthy and Salojipally are located in Tekmal Mandal. As per census 2011, the total population of Tekmal Mandal is 37,879[24] of which male and female are 18, 639 and 19, 240 respectively. The sex ratio of Tekmal Mandal is 1032, much higher than state (988) as well as the national (940) ratio.

Study area villages (Yelakurthy, Korampally and Salojipally*)**: There is no information available for Salojipally village is available in Census 2011 or district portal website or even in Statistical Year Book, 2015. But data for Korampally and Yelakurthy is available. Hence, referring Census 2011 and data gathered from Primary Consultation the cumulative total population of the mentioned study area villages (Yelakurthy, Korampally and Salojipally)*** is 3,803 out of which 1,824 are male and 1,979 are female. The average sex ratio in these 3 study area villages is 1085. The details are presented in **Appendix H** and shown in **Figure 4.9.**

Household Size: Considering the Census 2011 data of the villages, field visit observations and consultations with the community reveals that average HH size of the 3 study area villages is around 5-7.

Figure 4-9: Gender Ratio in Study Area



Source: Census 2011

4.5.2 Schedule Caste and Schedule Tribes (SC/ST)

Medak District and Tekmal Mandal:

As given in Census, 2011 the Schedule Caste (SC) population of Medak District and Tekmal Mandal are 5, 37,947 and 7,532 respectively, i.e. 17.73% and 19.88% of the total population. And the Scheduled

[23] *http://www.medak.telangana.gov.in/medak/login.apo*

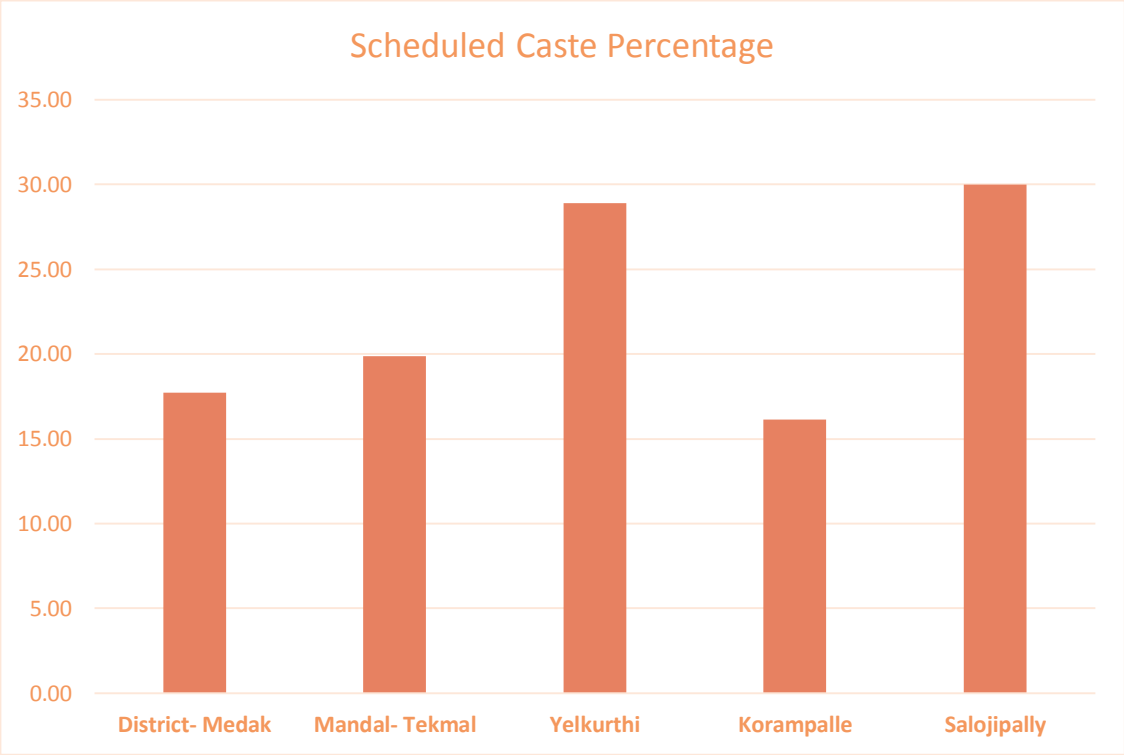
[24] *Census 2011*

Tribe (ST) population is 16, 8985 and 5,939 of Medak District and Tekmal Mandal respectively. The STs, thus, form 5.57% and 15.68% of the total population of Medak District and Tekmal Mandal respectively.

Study area villages (Korampally, Yelakurthy and Salojipally):

As surmised from Primary Consultation as well as census 2011, the SCs of constitute 28.91%, 16.15% and 30% of the total population of Yelakurthy, Korampally and Salojipally villages respectively. The percentage is either close to or higher than average of both the Mandal and District. But worthy to note there is no ST population in the study area villages. This also testified during the consultation with the villagers. Details of SC population in the study area is given in **Appendix I** and shown in **Figure 4.10**.

Figure 4-10: Study Area Scheduled Caste Population



Source: Census, 2011

4.5.3 Literacy in the study area

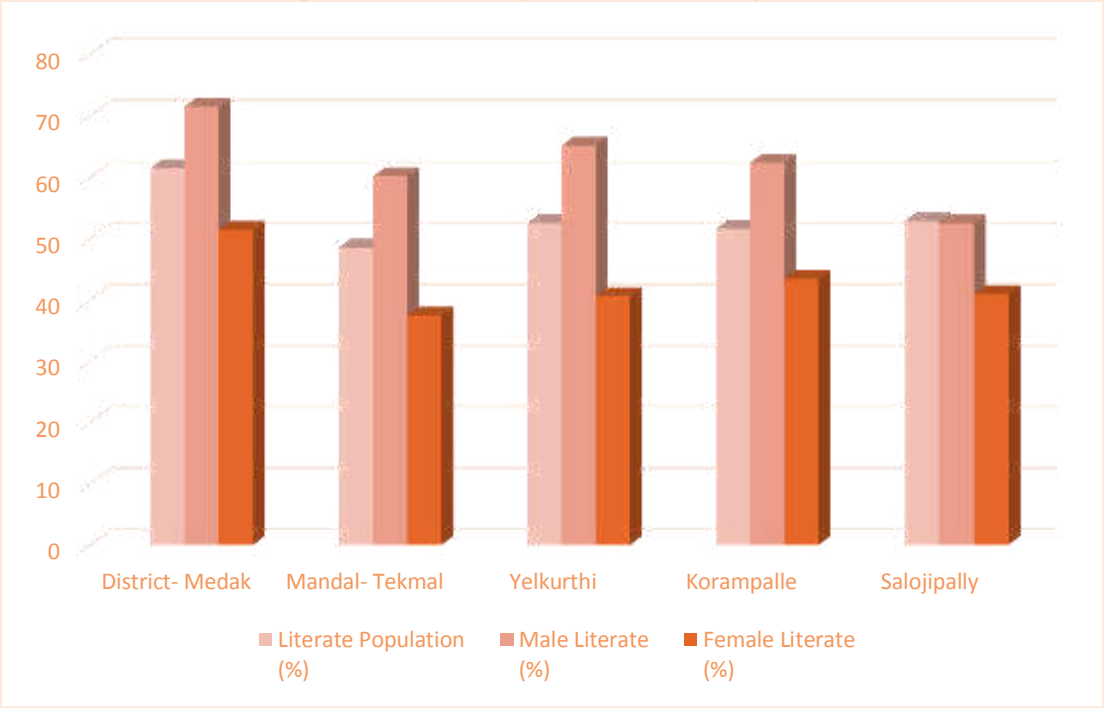
Medak District and Tekmal Mandal:

As given in Census, 2011 the Literate Population of Medak District and Tekmal Mandal are 16, 37,137 and 15,931respectively. As per Census, 2011 around 61.42% of the total population above the age of 6 years in Medak District and 48.51% of the same in Tekmal Mandal are literate.

Study area villages (Yelakurthy, Korampally and Salojipally):

As information retrieved during primary consultation at all the three villages & referring to Census 2011, 52.50% of the total population are above the age of 6 years are literate ate Yelakurthy village out of which 65.10% of male and 40.54% of Female of the same are literate; 51.54% of the total population who are above 6 years age are literate at Korampally village of which 62.31% of male and 43.42% of Female are literate and 52.80% of the total population at Salojipally are literate of which 52.45% of male and 40.85% of Female are literate.

Figure 4-11: Literacy Scenario in Study Area



Source: Census, 2011

In average all the 3 study area villages have more than 52% literate population. The male literacy rate stands around 64% and female around 42%, much lower than the Telangana State average, which is 74.95% and 57.92% for male and female respectively. The village wise literacy rate provided in **Appendix J** and shown in **Figure 4.11**.

4.5.4 Workforce Participation and Occupation

As published in the 'Report on District Level Estimates for the State of Telangana (2013-14) Government of India' by Ministry of Labour & Employment Labour Bureau, Chandigarh, Work Force Participation Rate (WFPR) of age15 Years and above for Telangana State is 64% of the total population. The percentage of workers among the total male population of the state is 76.3% and among the female population 51.3%.

Medak district:

As per Census, 2011 total working population of Medak district is 14, 42,203 and non-working population is 15, 91,085. Out of working population 3, 37,942 peoples are dependent on agriculture. This implies that about 24. 49 % of the total working population in Medak district are involved directly on cultivation or allied activities.

Tekmal Mandal:

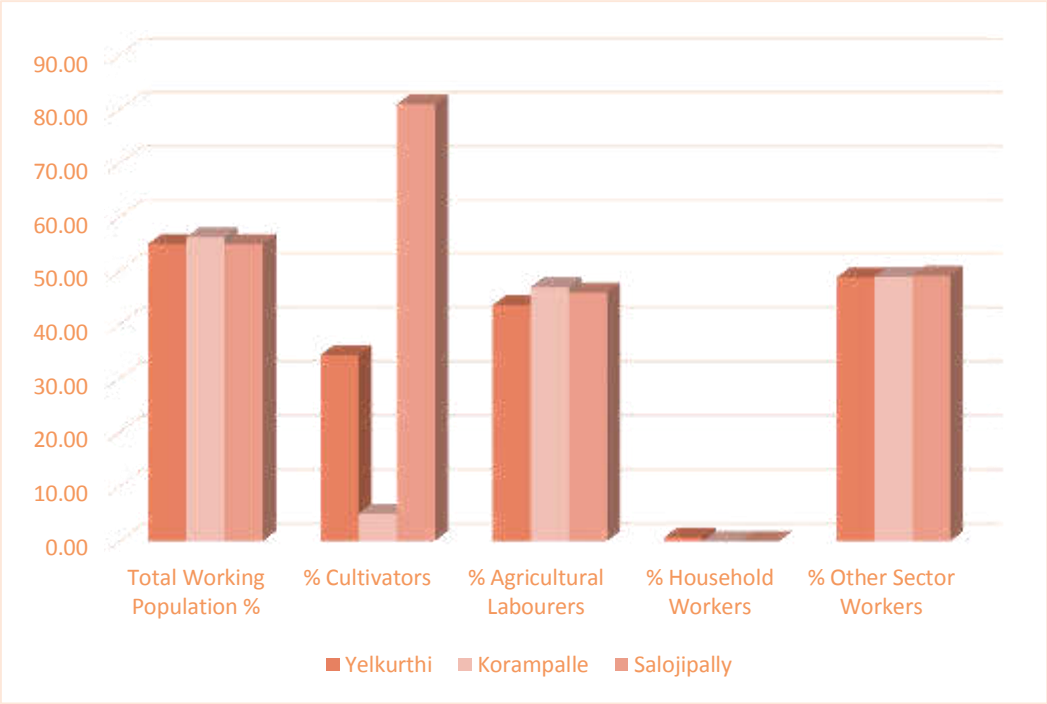
As per Census, 2011 the average WFPR of Tekmal Mandal is about 52.28%. The percentage of cultivators and agriculture labours stands at 38.30% and 48.71% respectively. Household workers in the district is just 1.32% of the total workforce. Other work force participation rates stands at 11.67%.

Study area villages (Yelakurthy, Korampally and Salojipally):

According to Census 2011 as well as from the information gathered during field visit the average percentage of cultivators of the three study area villages (Yelakurthy, Korampally and Salojipally) stands out to at 34.30%, 5.02% and 81% respectively. Comparative analysis of workforce participation data shows that major livelihood resource in the study area is agriculture. Majority of the population in the

study area villages sustains on agriculture and allied activities. The distinct village wise percentage of the workforce distribution is given in **Appendix K** and shown in **Figure 4.12**.

Figure 4-12: Workforce Participation Rate in the Study Area villages

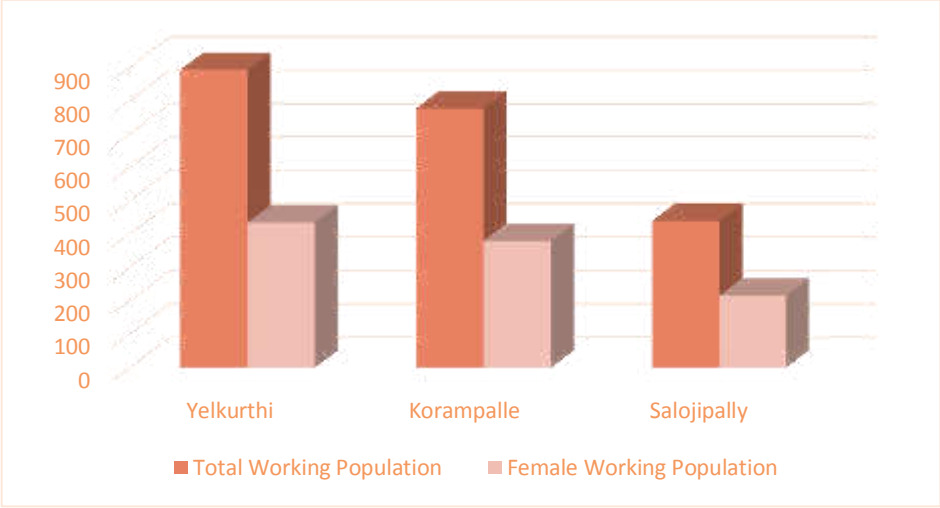


Source: Census, 2011

Females Workforce participation:

As stated in the Report on District Level Estimates for Telangana State, 2015- 16 by Ministry of Labour and Employment, Govt. of India the Female workforce participation rate in Telangana State is 53.50%. Census 2011 reports that the female work participation rate in Medak District is 41.90% and at Tekmal Mandal it is 47.60%. With regards to study area villages an average female work participation rate is 48.49% which is lower to the average of state (53.5%). Details of Female WFPR is given in **Appendix K** and shown in **Figure 4.13**.

Figure 4-13: Female Work Force participation in Study Area Villages



Source: Census, 2011

4.5.5 Wages

According to Telangana Minimum Wage rule with April 1, 2015 to September 30, 2015, the minimum wage for Contract Labours in all sector is Rs. 387.65 and Rs. 310.73 for Highly Skilled and Skilled labourers respectively.

Scehduled Employment CONTRACT LABOUR	Basic Wage (INR)
CATEGORY	
Highly Skilled	387.65
Skilled	310.73

Source: http://www.paycheck.in/main/salary/minimumwages/andhra-pradesh

4.5.6 Livelihood Source

Agriculture and Cropping Pattern

As per Census, 2011, about 24.49% and 39.60% of the working population is directly dependent on agriculture, as Cultivators and Agricultural Labourers respectively in Medak district. The scenario in Tekmal Mandal is 38.30% and 48.71% for Cultivators and Agricultural Labourers respectively. Thus, Agriculture continued to play an important role in the economic growth of the region of the proposed Solar Power Project.

As mentioned in State Agriculture Portal[25], Telangana grows 27 important crops in Kharif and Rabi seasons put together covering an area of about 53.51 lakh ha. The important crops grown are Rice (14.19) lakh ha, Maize (6.63) lakh ha, Pulses (6.11) lakh ha, Groundnut (1.89) lakh ha, Cotton (18.13) lakh ha, Chillies (0.83) lakh ha and Sugarcane (0.41) lakh ha. 78.76% of the area is grown in Kharif and the remaining 21.24% is cultivated in Rabi.

Cropping Pattern

The Crop wise area in Telangana State for important crops for the year 2011-12 in brief is given in **Table 4.14**.

Table 4-14: Cropping wise Cultivated and Irrigated Area, Telangana State

S. No	Crop	Area under the crop (lakh ha)	Area Irrigated (lakh ha)
1	Rice	17.50	17.06
2	Maize	5.91	2.15
3	Groundnut	1.71	1.50
4	Cotton	15.81	2.30
5	Other crops	16.07	5.63
Total		**57.00**	**28.64**

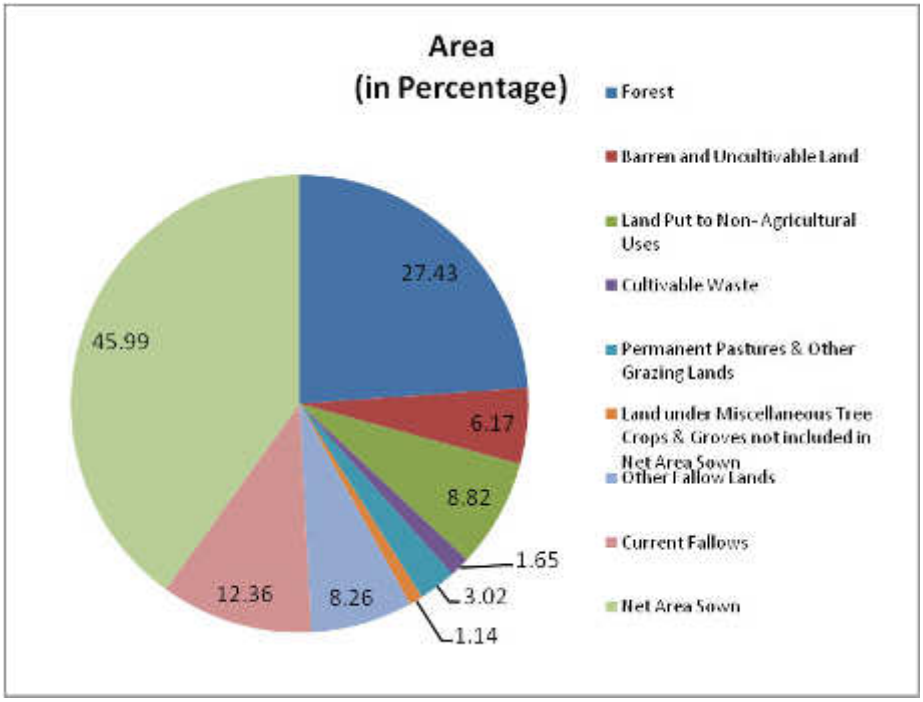
Cropping Intensity

Cropping intensity is one of the indices for assessing the efficiency of agriculture sector. The cropping intensity i.e. the ratio of Gross Area Sown to Net Area Sown during 2011-12 is 1.16 Lakh Ha. The level

[25] *http://www.telangana.gov.in/Departments/Agriculture-and-Co-operation*

of cropping intensity moves in consonance with the behaviour of the monsoon and availability of irrigation water as indicated in **Figure 4.14**.

Figure 4-14: Cropping intensity in Telangana



Source: Source: http://www.telangana.gov.in/Departments/Agriculture-and-Co-operation

The cropping pattern and area wise yield of Medak District in given in **Table 4.15**.

Table 4-15: Production & Productivity and Price of Major Crops

District	Crop	Area in hectares	Out-turn in tonnes
Medak	Maize	142205	643031
	Total cotton	128865	446479
	Rice	110355	372597
	Bengalgram	30020	44039
	Redgram	29195	19736
	Greengram	27485	27041
	Jowar	25035	27860
	Blackgram	15327	13840

Source: http://www.telangana.gov.in/About/Districts/Medak

Rice, Moong, Tur Dal (Bengal Gram), Sugar Cane and Jowar are normally grown crops in the project area villages. Among these, one type of Paddy, Moong, Tur Dal, Jowar and Corn are Rabi Crops, i.e. harvested during or close to winter season. While another type of Paddy and Sugar Cane are Kharif crops. In all the study area villages almost contiguous fields are seen, with little intervals of fallow lands. Though not cultivated properly scattered Neem Trees surrounding the cropping fields at few places area are seen. It was informed during that Sugarcane used to be a cultivated commercial crop in the area, but due to concurrent closure in Sugar Producing Units in near and far places, that was reduced

and presently cultivated only at a limited scale in the study area villages. Village wise productivity is given in **Table 4.16.**

Table 4-16: Production & Productivity and Price of Major Crops

Sl. No.	Crop	Harvest Period	Study Area Villages	Productivity (q/ Acre)	Price/ Quintal (in INR)
1	Paddy (Kharif)	May	Korampally	25-30	Rs. 1500.00
			Yelakurthy	25-30	Rs. 1500.00
			Salojipally	-	-
2	Paddy (Rabi)	November	Korampally	40-50	Rs. 1500.00
			Yelakurthy	40-50	Rs. 1500.00
			Salojipally	25	Rs. 1300.00- Rs. 1400.00
3	Moong (Rabi)	September-October	Korampally	4	Rs. 12000.00
			Yelakurthy	4	Rs. 12000.00
			Salojipally	-	-
4	Tur (Bengal Gram) (Rabi)	December	Korampally	5	Rs. 15000.00
			Yelakurthy	5	Rs. 15000.00
			Salojipally	-	-
5	Sugar Cane (Kharif)	June	Korampally	40	Rs. 2600.00
			Yelakurthy	40	Rs. 2600.00
			Salojipally	-	-
6	Jowar (Rabi)	October-November	Korampally	15-20	Rs. 1500.00
			Yelakurthy	15-20	Rs. 1500.00
			Salojipally	-	-
7	Corn (Rabi)	October - January	Korampally	15-20	Rs. 2000.00
			Yelakurthy	15-20	Rs. 2000.00
			Salojipally	20	Rs. 1000.00- Rs. 1200.00

Source: Primary Consultation in the Study Area Villages

Livestock:

Telangana has rich livestock resources especially cattle and Sheep population accounting to 5.52% of country's population. Rural population in the State is predominantly agricultural with more than 2/3 of its workforce being engaged directly in the agriculture sector. About 29 lakh families in Telangana State are engaged in livestock sector for their livelihood. The value of livestock produce is estimated to be Rs. 12403 crores at current prices and the livestock sector contributes 4.86% to GSDP (2010-11 Third Revised Estimates). Animal husbandry and dairy are important sources of supplementary income to farmers[26].

The region of the State stands 10th in Livestock population, 1st in sheep population, 12th in Goat population, 5th in Poultry, 13th in Bovine population and 17th in pig population, in the country as per the Livestock Census, 2007. With an annual output of 942 crore eggs, the Telangana stands 3rd in egg

[26] *Source: http://www.telangana.gov.in/departments/animal-husbandry-and-fisheries*

production in the country. Every eighth egg in the country comes from Telangana. With annual meat production of 4.29 lakh MTs Telangana stands 6th in the country in meat production. With an annual production of 39.51 lakh MTs of milk, Telangana occupies 13th position in the country in milk production (2012-13 approved estimates of GOI).[27] And as per 19th Livestock Census, the State has a population of 50.34 lakh cattle, 41.94 lakh buffaloes, 128.75 lakh sheep, 46.75 lakh goat and 691.59 lakh poultry.[28]

Hoards of Milch animals near manmade storage reservoir at Korampally

The animal population consists mainly of mulch animals. Buffaloes, Cows, Sheeps and Goats are seen during field visit. During consultation, it was reported that the villages have notable number of livestock population and small ruminants (around 70-80% HH) i.e. Buffaloes, Cow, Goats and sheep. Pigs are also seen in stray manner. Consultation with villagers and as seen during field visit revealed that though there are no demarcated grazing area in any of the study area villages Animals are grazed at open fields surrounding the cultivation fields. Open fields and also agricultural lands kept unused for reason of Nitrogen consumption are being used as Grazing Lands. Farmers mostly use agricultural waste after harvest as fodder for livestock.

4.5.7 Local Employment and Migration

During consultation it was observed that, labour in agriculture, daily wage labour in local brick kiln (only at Salojipally) and labour in other sectors (as porter) are important source of livelihood in study area villages. Also the same has been testified by the Census 2011. There is no big industry in the region.

Though most of the people rely on Cultivation as their primary source of Livelihood. Hence, migration is very less in this region. Only a handful people go to nearby towns like Jogipet, Sangareddy or in bigger cities like Hyderabad to work as Mason or daily wage carpenters. Some also go to closer Shankarampet or Fasalwadi area to work as labourers in Sugar or Spin Mills.

4.5.8 Gender Empowerment Status

The female work participation in Telangana is lower than that of male but is the highest amongst all the states in India. However, the women workers in the state are still not better placed, specifically by

financial status because the workforce is concentrated in activities which are unorganized, informal, seasonal, insecure, menial and poorly paid. There is also significant wage disparity between the male and female workforce.

In Medak district, female workforce participation is around 41.90%. In the study area villages Korampally, Yelakurthy and Salojipally the average female work participation is 48.91%, 48.77% and 49.09% respectively. Additionally, female labourers are engaged in sowing, weeding, plant protection, grading, kitchen gardening, cleaning of grains, harvesting, feeding the cattle, irrigating fields, taking care of livestock, growing vegetables and partially engaged with SHGs under Development of Women and Children in Rural Areas (DWCRA).

[27] *Source: http://www.telangana.gov.in/departments/animal-husbandry-and-fisheries*

[28] *Source: Statistical Year Book, 2015 by Directorate of Economics And Statistics, Government Of Telangana*

Following the Census, 2011, the average literacy rate of female both at District and Mandal level is found much lower than the male. The scenario is almost the same at the study area villages. The average difference between the rate of literate between male and female is about 20%. The details in given in **Appendix J.**

More, the situation is neither very bright on social status of the women. During consultation with the women participant it was observed that, early marriage and child marriage, minimal participation of women in household or economic decision making and lesser economic freedom is common in the area. The women are entirely responsible for household chores and additionally engaged as agriculture labour, harvesting, feeding the cattle, and taking care of livestock.

Discussion with School Staff at Salojipally

Consultation with women in Korampally

4.5.9 Self Help Groups (SHGs)

"According to the National Bank for Agriculture and Rural Development (NABARD), a self-help group is a small economically homogeneous and affinity group of rural poor voluntarily coming together: to save small amounts regularly; to mutually agree to contribute to a common fund; to meet their emergency needs; to have collective decision making; to solve conflicts through collective leadership and mutual discussion"

According to the website portal of "Mission for Elimination of Poverty in Municipal Areas29", Medak District has 6850 SHGs in the FY- 2015-16.

There are schemes under State govt. support to empower women both financially and socially through Self Help Groups in Telangana.

a) Development of Women and Children in Rural Areas (DWCRA)[30]

The Development of Women and Children in Rural Areas or DWCRA is a government sponsored anti-poverty programme of the Ministry of Rural Development. Each DWCRA group consists of 15 to 20 women from below poverty line rural families. In September 1982, the Government of India (GOI) launched the DWCRA programme under the Integrated Rural Development Programme (IRDP). The program was started in 50 districts (all over India) on a pilot basis. This was the first rural development program which focused entirely on the development of women and children.

The scheme - DWCRA was aimed to improve the socio-economic status of the poor women in the rural areas through creation of groups of women for income-generating activities on a self-sustaining basis. The main strategy adopted under the programme was to facilitate access for poor women to employment, skill upgradation, training credit and other support services so that the DWCRA women as a group could take up income-generating activities for supplementing their incomes. It sought to encourage collective action in the form of group activities which were known to work better and were

[29] *https://www.efms.serp.telangana.gov.in/MEPMATG/View/Reports/SLF_SHGBasicCoverageReport.aspx*

[30] *Source: http://www.icmrindia.org/*

more sustainable than the individual effort. It encouraged the habit of thrift and credit among poor rural women to make them self-reliant.

Every group chose a leader, called the organizer, who conducted group meetings and maintained the group's accounts. Initially, the focus of the groups was on saving money. Most of the groups started with the motto - 'save a rupee per day.' Every month, the savings were deposited at the post office or in the banks. The groups also extended credit to needy members from their savings. While in general, DWCRA groups met once a month, some groups got together more often. Based on their skills, the group members collectively decided on the income generation activity that they would undertake. At the monthly meetings, these women also discussed their problems and tried to find solutions. The state government deployed a *Gram Sevika* (village coordinator) for every village to oversee the implementation of the DWCRA program.

In the study area villages a few DWCRA group is found to be existed.

b) Stree Nidhi

As stated in the Telangana State Government Website https://www.streenidhi.telangana.gov.in/SNTG/UI/Home.aspx there is a scheme under govt. aide namely *Sthree Nidhi*, which provides credit to the poorer SHG members in times of need and for growth and sustained development. It is stated in the website, "*Sthree Nidhi credit cooperative Federation Ltd., is promoted by the Government and the Mandal Samkahyas to supplement credit flow from banking sector and is a flagship programme of the Government. Sthree Nidhi provides timely and affordable credit to the poor SHG members as a part of the overall strategy of SERP for poverty alleviation.*"

- Samruddi deposit by SHGs was made compulsory to access loans from Sthree Nidhi.
- SHG has to contribute Samruddi deposit amount @ Rs.100/- per month from November 2012 till last month before accessing loans from Stree Nidhi. Further, 80% of SHGs in the VO have to contribute Samruddi deposits.
- The loan requests for income generating activities should be made during SHG/VO meetings only with proper record in the minutes of the meeting.

c) In a recent declaration the Telangana IT minister K.T. Rama Rao announced, that a centre of excellence for promotion and replication of best practices in women's empowerment through Self Help Groups will be set up by the Telangana state government.

d) Besides, for the following reasons SHGs are also active in some places as follows:

Swarna Jayanti Gram Swa-Rozgar Yojana (SGSY) **-** The program focus is on using the SHG approach for poverty reduction through channeling of bank loans and government subsidies. Budget is provided for training and working capital support to SHGs but efficiency of use varies with implementers.

SHGs promoted by Regional Rural Banks**-** Focus is on building up priority sector clientele for SHG-Bank linkage. Budgets for SHG capacity building vary from bank to bank. Efficiency of budget use can even vary from branch to branch of the same bank.

During consultation it was observed that, only a few DCWRA groups found to be existed. A village list of such is given in **Table 4.17.**

Table 4-17: Village wise DWCRA List[31]

Study area village	Name of SHGs	No. of Groups	Activity

[31] *Source: Primary Consultation*

Korampally	DWCRA Group	2	Production and Sell of Handicrafts like Bamboo Basket, Tailoring items etc.
Yelakurthy		3	Production and Sell of Handicrafts like Bamboo Basket, Tailoring items etc.
Salojipally		3	Production and Sell of Handicrafts like Bamboo Basket, Tailoring items etc.

Source: Primary Consultation

4.5.10 BPL Families & Vulnerabilities

According to a report published in 'Deccan Chronicle'[32] newspaper in Telangana, "The number of people covered under white ration cards (which signify BPL) has increased from 2.24 crore to 2.81 crore and the cards increased from 80.91 lakh to 89.47 lakh. The increase is attributed to the steep increase in income ceiling to determine BPL families."

So far consultation with the community members as well as Panchayat Members and during visit by the Arcadis ESIA Team there are no BPL family reported to be present in any of the study area villages, viz. Korampally, Yelakurthy and Salojipally.

Vulnerable group is "Groups that experience a higher risk of poverty and social exclusion than the general population. Ethnic minorities, migrants, disabled people, the homeless, those struggling with substance abuse, isolated elderly people and children all often face difficulties that can lead to further social exclusion, such as low levels of education and unemployment or under employment."

During community consultation, it was observed that, some vulnerable group like landless family, physically handicapped and widow are present in the study area villages, shown in following **Table 4.18**.

Table 4-18: Village Wise Vulnerable Group

Village Name	Vulnerable group (lump sum)			
	Women headed Family	Lone Widow	Physically Handicapped	Landless HH
Korampally	1	1	-	4
Yelakurthy	-	-	-	-
Salojipally	2	-	-	2

Source: Primary Consultation in Study Area Villages

The project proponent may be required to focus on providing employment opportunity to the vulnerable members and also the implementation of program under CSR activity for them. During dialogue with RSSPL project team, it was confirmed that land has not been acquired from any vulnerable Household or family.

4.5.11 Land holding pattern of the District and Mandal

Telangana accounts for 3.5% of India's total geographical area and 2.9% of population and ranks 12th both in geographical area and population among Indian States. The State is newly formed in 2014, as the 29th State in India. Hence there is no sufficient record is available for Telangana exclusively in this regard. The detailed information of land utilization in Andhra Pradesh[33] is shown in the following **Table 4.19.**

[32] *Source: http://www.deccanchronicle.com/141102/nation-current-affairs/article/*

[33] *Agricultural Census, 2011*

Table 4-19: Distribution of Average Size per Holding - All Social Groups

State	Average size per holding in Hactre					
	Marginal	Small	Semi Medium	Medium	Large	All size groups
Andhra Pradesh	0.44	1.41	2.63	5.56	15.50	1.08

Source: Agricultural Census, 2011

The only source on correct scenario regarding the matter is the Agricultural Action Plan, 2015-16 of Telangana State Government. However as mentioned in Agricultural Action Plan, 2015-16, the average size of land holding per farmer in the state during 2010-11 is at 1.12 hectares and the same is likely to fall below due to further fragmentation of the farm holdings.[34]

Average of Landholding Size of the Land Sellers and land given to ReNew Saur Shakti Private Limited

During discussions with the local community, it was understood that the average land holding size in the study area villages is 5-7 acre per household, most of which are agricultural. The 65 MW Solar Power Plant supposed to be spread at Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal of Medak District. However, as informed by the representative of the Project Proponent and visited by the Arcadis ESIA Team the total Land area procurement for Korampally is 200 Acres, Yelakurthy is 120 Acres and for Salojipally would be 125 Acres.

A few of the Land Owners in Korampally and Yelakurthy villages, who has given lands to ReNew Saur Shakti Private Limited (RSSPL) were consulted by the visiting Arcadis ESIA Team and information procured. As Land Procurement in Salojipally has not been finalized till the time of the visit, information regarding the same could not be gathered. The details of information, as stated by the Land owners, regarding the amount of land given to ReNew Saur Shakti Private Limited (RSSPL) by them through Sale Deed Agreement and Land remaining in their hand is given in **Table 4.20**. It is to be noted that though Sample Sale deeds has not been provided by the Project Proponent, a list of Land Procured so far along has been detailed below in Table 4.20.

Table 4-20: List of Land Owners, Land Size given to RSSPL[35] and Remain in Their Hand

Mandal & District	Village	Land Owner Name	Land Given to RSSPL	Land remaining in their hand
Tekmal Mandal & Medak District	Korampally	Chellapally Keshaiah	3 Acre	1 Acre
		Chellapally Mugallaiah	3 Acre	1 Acre
		Kallu Hanumanthu	1 Acre	1 Acre
		Yellampalli Dasrath	2 Acre	6 Acre
		Machkuru Satyamma	2 Acre	4 Acre
		Kanirisetty Gyaneswar	14 Acre	100 Acre
		Harikanth	16 Acre	50 Acre
		Indra Reddy	6.25 Acre	50 Acre
		Bupathi Reddy	6.25 Acre	50 Acre
		N. Chandraiyah	5.5 Acre	10 Acre
	Yelakurthy	Kandipally Manaya	3 Acre	4 Acre
		K. Eshwaraiya	4 Acre	4 Acre

[34] *http://agrisnet.tg.nic.in/2015/Ferti/AgriActionPlan2015-16New.pdf*

[35] *ReNew Saur Shakti Private Limited*

Mandal & District	Village	Land Owner Name	Land Given to RSSPL	Land remaining in their hand
		K. Anjaiah	3.5 Acre	4.5 Acre
		K. Bhumaiya	3 Acre	3 Acre
		Yadul Hussain	5 Acre	5 Acre
		Md. Hussain	4 Acre	5 Acre
		T. Lakshmireddy	2.5 Acre	5 Acre
		Sahid Ali	1.5 Acre	3 Acre
		K. Narsamma	1.5 Acre	2 Acre
		T. Ramareddy	2.5 Acre	2.2 Acre

Source: Primary Consultation[36]

4.5.12 Irrigation

As per CGWB report 2014-15 of Medak District the average annual rainfall during 2014 was 861 mm. The annual number of the rainy days is around 60 days. As per CGWB Report 2014-15, the ground water level range in Medak District is 10 mbgl – 20 mbgl during the study period 2014-15. The Western Disturbance brings some rain in winters. But a notable period of the year the area remains dry. Thus, it is evident that the agriculture in this region is not solely dependent on Rain and Irrigation plays a very important role. Notable amount of the geographical area in the district is under irrigation. Canals and bore wells are the most important sources for irrigation in the project affected areas.

As per CGWB report and as given in state agriculture department portal[37] during 2012-13 the Gross Area Irrigated by different sources was 25.57 lakh ha and the net area irrigated was 17.74 lakh ha and the irrigation intensity was 1.44. The detail of irrigation in the State is given in **Table 4.21**. The study area villages have bore wells in the field as the major resource for irrigation. The local people in Korampally and Yelakurthy villages are also building local trench for retention as well as drainage of Rain Water and also water from the Manjra River, located about 22 Km. southwest from Korampally and utilise it to most optimum level during cultivation.

Table 4-21: Details of Irrigation in Telangana State[38]

S. No	Source	Gross Area irrigated	Net Area Irrigated	Irrigation Intensity
1	Tanks	179485	157662	1.14
2	Canals	120525	90296	1.33
3	Tube Wells	1441018	972427	1.48
4	Dug Wells	766392	513421	1.49
5	Other Sources	49684	40311	1.23
Total		**2557104**	**1774117**	**1.44**

[36] *As mentioned earlier as the Lands (about 125 Acres) in Salojipally is not yet finalised till the time of visit, consultation regarding same couldn't be done.*

[37] *http://www.telangana.gov.in/Departments/Agriculture-and-Co-operation*

[38] *Source: http://www.telangana.gov.in/Departments/Agriculture-and-Co-operation*

4.5.13 Amenities & Infrastructure

Village and district level integrated education, health amenities data available as per census 2011, as well as from other resources and study area villages visit are described in the section below.

Medical Facilities:

District: As per the District Website portal39, Medak 536 Sub Centers , 67 PHCs , 2 CHCs- at Ramayampet & Kohir and 4 Urban Health Centers. As per Statistical Year Book, 2015, Directorate of Economics and Statistics, Government of Telangana, there are 9 General Allopathic Hospital and 1 Ayurveda Hospital under AYUSH department in Medak District. Implementing and monitoring health activities is done by District Medical & Health Officer (DMHO) office for the institutions under District Directorate Public Health & Family Welfare. DMHO monitors these activities through 10 Community Health & Nutrition Cluster (CHNCs) headed by Senior Public Health Officers (SPHO). Monitoring private hospitals, Clinics, labs and scanning centers is also under the purview of DMHO. There are 10 CHNCs headed by SPHOs at Sadashivpet, Narsapur, Patancheru, Ramayampet, Gajwel, Dubbak, Siddipet, Kohir, Narayankhed & Jogipet. The SPHOs are supported by 8 employees CHO, MPHEO, HE, Ophthalmic Officer, DPMO, LD Computer and Data Entry Operator. They have to supervise the activities of PHCs, Sub centers in their CHNC area.

Schemes Sponsored by Health Department

Primary Health Care is the responsibility of Health department. Secondary care comes under APVVP institutions headed by DCHS. 1. Universal Immunization Program: (Immunization/Vaccination/IPPI/Vit-A, Prophylaxis) 2. Family Welfare program: (Eligible couple survey, Family Planning operations, Temporary methods incentives to beneficiaries etc.) 3. Janani Suraksha Yojana (JSY): Rs 700/- is being paid as incentive to BPL pregnant women who deliver at Govt health facilities. Rs 300 is also paid from state funds called SUKHIBHAVA. 4. Janani Shishu Suraksha Karyakram (JSSK): Under this free tests, free drugs & free diet for pregnant women, new borne child is covered in this scheme. This is implemented zero expenditure to pregnant & Lactating mothers. With the implementation of this scheme deliveries at Govt facilities improved to 49% now. 5. National Leprosy Eradication Program (NLEP): Aimed at detecting, treating the patients suffering from leprosy. This program also focuses on preventive measures. 6. Revised National Tuberculosis Control Program (RNTCP): This Programme is for detection and treatment of the patients affected with TB, MDR TB Cases detection. AWARNESS IN SCHOOL- TB information card distributed in all Govt and Private schools, reading TB news in post prayer time once in 3 months. 7. National Blindness control program: Prevention of blindness and conducting cataract surgeries. 8. NVBDCP: Prevention and control of vector borne diseases like Malaria, Dengue, Chicken guinea, Filariasis, Japanese encephalitis.[40]

Project area Villages: In the study area villages the Health amenities are severely inadequate condition. None of the three Study Area villages viz. Korampally, Yelakurthy and Salojipally have any sorts of Private or Govt. Health Care Unit. As informed during consultation people generally avail local unregistered medical practioners or go to nearby Health Centres outside the village. It was informed by Local Community Members and Panchayat Members joint pain and other general diseases are common problems in the area. The nearest Health Sub Centre is at Tekmal Mandal Town about 1. 7 Km from Korampally, 4.5 Km from Yelakurthy and 2.6 Km from Salojipally site. Details of the health scenario given in **Table 4.22**.

[39] *http://www.medak.telangana.gov.in/medak/department*

[40] *Source: http://www.medak.telangana.gov.in/medak/department*

Table 4-22: Study Area Village Wise Medical Facility Resources[41]

Study Area Villages	Medical Infrastructure Scenario
Korampally	There is no health unit in the village. The nearest Health Sub Centre is at Tekmal Mandal about 1.7 Km from the village. For emergency the local people either go to unregistered quacks. The ANMs visit once in every 8 days for routine immunisation and vaccinations. To avail hospital facility people have to go to Govt. Dy. Civil Hospital or other private hospitals at Jogipet about 14 Kms from the village. Emergency No. 108 is availed for Ambulance from Govt. support in times of need.
Yelakurthy	The situation is just like same as Korampally village, there is no health unit within the village. The nearest Health Sub Centre is at Tekmal Mandal about 4 Km from the village. For emergency the local people either go to unregistered quacks. The ANMs visit once in every 8 days for routine immunisation and vaccinations. To avail hospital facility people have to go to Govt. Dy. Civil Hospital or other private hospitals at Jogipet about 16 Kms from the village. Emergency No. 108 is availed for Ambulance from Govt. support in times of need.
Salojipally	The nearest Health Centre is at Tekmal Mandal Town about 2.6 Km from the village. Emergency No. 108 is availed for Ambulance from Govt. support in times of need.

Source: Primary Consultation at Study Area Villages.

Apart from availing the Govt. Hospital in Jogipet, which is on an average about 17 Kms from the study area villages, there are numerous Private Clinics and Hospitals. To name a few D. N. Reddy Hospital and Dangoria Charitable Trust Hospital etc. Besides, one "MNR Ayurveda Medical College" on Sangareddy-Narsapur Road at Fasalwadi near Sangareddy. However, the distance is about 39 Km. away on average from the Study Area Villages.

Govt. supported Mobile Health Check-up (Vans) units also reported to be visited, but not with regular intervals in the study area villages.

Education:

As per Statistical Year Book, 2015, Directorate of Economics and Statistics, Government of Telangana, there were total 3183 schools in Medak district during the study year 2013-14. When it comes to total no. of school by type, Medak has about 58 Primary Schools, 416 Primary with Upper Primary Schools, 19 Primary with Upper Primary, Secondary and Higher Secondary Schools, 27 Upper Primary with Secondary and Higher Secondary Schools, 72 Primary With Upper Primary And Secondary Schools and 771 Upper Primary With Secondary Schools.

Govt. Primary School, Korampally

As given in the Statistical Year Book, 2015 Medak District has 1 "District Institute of Educational Training". Medak has 15 Ashram Schools exclusively for Scheduled Tribe Community.

According to the Statistical Year Book, 2015 the district has 209 Junior Colleges. Students from the study area villages normally go to Tekmal Mandal Town and Jogipet which is about 4 and 16 Kms away on average for availing higher educational facilities. There is one "Govt. Junior

[41] *Source: Primary Consultation at Study Area villages*

College" at Tekmal. Other than that there are number of colleges at Jogipet like, "Nehru Memorial Govt. Degree College", "Sri Sai Degree College" etc. There is also one "Govt. Polytechnic College" at Jogipet.

Govt. High School, Yelakurthy

As revealed during visit and consultation that all the study area villages (Korampally, Yelakurthy and Salojipally) have at least one Govt. Primary School in each village. Among these Yelakurthy have one Govt. High School up to Class 10th, where the Primary Section also runs in different time schedule. All the schools have separate sanitary blocks for Boys and Girls. Special mention needs to be made for Salojipally Primary School, which have only one drinking water tap along with the above ground Reservoir and doesn't have any running water facilities. Schools at Korampally and Yelakurthy are in better situation in this regards. It was also found in the Salojipally Primary School that the pupils are compelled to sit on ground in the class room. They don't have any bench to sit. More the school at Salojipally is facing space crunch and don't have any area exclusively used for cooking midday meal.

The project proponent may consider the above mentioned matters and for betterment of the situation through CSR activities.

The School at Yelakurthy have the basic needed facilities like numbers of Drinking Water access points, separate toilet arrangements and cooking area for mid- day meal cooking arrangements. But there are dearth in sitting arrangements and drinking water facility at the Primary School at Salojipally.

Photo 4-4: Facilities provided in village schools

Hand Pump at Yelakurthy Govt. High School Premises

Separate Toilet Blocks for Girls' with Sanitary septic tanks behind, at Yelakurthy Govt. High School

Urinal Blocks for Male at Yelakurthy Govt. High School

Concrete Water Tank at Yelakurthy Govt. High School.

Drinking Water Facility

The Drinking Water Supply is a very important issue as over 80% of health problems are due to consumption of unsafe water and increasing health awareness among the rural public, underlines the additional attention to be paid to the subject. Hence, one of the most important programs of the Government is the provision of safe drinking water to the rural population. The District Census Hand

Book, 2011 of Medak District states that about 28% of the rural population uses piped tap water from treated resource, 36% from untreated source and about 24% uses Hand Pump in Tekmal Mandal.

As per CGWB Report 2014-15, the ground water level range in Medak District is 10 mbgl – 20 mbgl during the study period 2014-15. During consultation, it was observed that Overhead tank water and bore wells are found to be the only source of drinking water in all the villages. Some scrap like abandoned Hand Pumps are seen in scatter. These are inadequate to cater to the drinking as well as other domestic water requirement. Overhead tanks were observed to be located at common places of the villages. However, it's not adequate for all villagers. As expressed during interaction, ground water depth is very low in the study area villages below 60 ft. Only at Salojipally Village the Drinking water is reported to be contaminated with fluoride as told by the villagers. But in Korampally and Yelakurthy people exerted that the drinking water they consume is safe for their health.

Separate Toilet Blocks with Tanks over the roof at the Toilet Blocks, Korampally Govt. Primary School

Midday Meal Cooking Area at Korampally Govt. Primary School

Classroom at Salojipally Primary School without proper sitting arrangements

Above ground Water Reservoir with a single tap at Salojipally Primary School complex

5000 Litre Capacity Overhead Tank at Yelakurthy Village

Overhead Tank at Salojipally Village

Sanitation:

According to District Census Handbook, 2011 of Medak District in Tekmal Mandal about only 13.3% of individual households in rural area are either having Latrine within their premises or/ and uses Public Latrine for the purpose, only 6.23% have Sanitary Latrines with septic tank facility and about 86.7% resort to defecate in open. During community consultation, it was observed that proper sanitation facilities are available in more than 50% households both in Korampally and Yelakurthy villages, but in Salojipally the situation in severe. As per consultation about 90% people there are without any latrines within their house premises. In interaction regarding the query about Swachh Bharat Mission scheme in their area the villagers answered that no such initiatives are seen so far.

Cooking source:

According to *District Census Handbook, 2011 of Medak district* in Tekmal Mandal of the district around 92% households use firewood, 1.41% crop residue, 0.22% cow dung cakes and around 5.46% uses LPG as cooking fuel resource.

During consultation it was observed that, LPG is preferred over fuel wood in the consulted villages. On an average around 85% households use LPG and 5% use fire wood at study area villages as cooking medium. Dried biomass, cow dung briquette are the other sources of energy being practiced by the villagers for cooking and heating.

Communication and Transportation facilities

As observed during visit at study area villages transportation facilities are inadequate in all study area villages viz. Korampally, Yelakurthy and Salojipally villages at Tekmal Mandal of Medak district. No railway station is present near to the study area villages viz. Korampally, Yelakurthy and Salojipally in less than 10 km. However Secunderabad Junction Rail Way Station is major railway station 83 KM near to Korampally. The district headquarters Sangareddy Town is about 42 km from the Project Site area. Road connectivity is there through Sangareddy- Medak Road. Medak town is about 35 Km away from the stiudy area villages. No regular Bus service available from the area. Auto rickshaw services are available for local movement .Otherwise people use their owned two wheelers.

Local transportation mode in Yelakurthy

The main site land parcels located in three villages, viz. Korampally, Yelakurthy and Salojipally, is on the main road crossing through the area namely Chinthakunta- Kottapally Road . State Highway No. 16 (Medak- Bodmatpally Road) is also within 3.5 Km, 2.19 Km and 0.88 Km from Korampally, Yelakurthy and Salojipally site locations respectively. It is to be mentioned that the site at Korampally is right on Chinthakunta- Kottapally Road. But lands at Yelakurthy and Salojipally need to have the access road to have link with the main road. Therefore, issue regarding RoW can be addressed only after finalization of land demarcation of the sites.

During site visit, it was observed that there is good road connectivity. Access roads within the study area villages are bituminous, concretized as well as Kuchcha. Telephone connectivity is available in all study area villages. Hence, it can be surmised that communication facilities is satisfactory from the site areas. Issue regarding RoW can be addressed only after finalization of lands in rest of the sites.

Power Supply:

As per Census, 2011 in around 89.9% households in the rural areas of Tekmal Mandal are having electricity connection. As per 41st Report of Standing Committee on Energy (2013-14) of 15th Lok Sabha on Implementation of ***Rajiv Gandhi Grameen Vidyutikaran Yojana*** around 102176 BPL households were provided electricity under RGGVY during the mentioned period. In the study area villages, it was observed that almost all the houses have electricity connection. Korampally and Yelakurthy said to have electricity connection for 100% households. While a few households in Salojipally don't have electricity connection and carrying on with Kerosene Oil and Candles for the purpose. During consultation it was said on an average duration of 22 hrs. /day electricity is available in the proposed project locations. Besides, there is separate electricity facility available for domestic and agriculture purposes. High Tension overhead transmission line have been noticed in some places in the study area villages.

Common Property Resource (CPR)

During consultation with Panchayat members and villagers, it was noted that all the study area villages have some sort of Common Property Resource (CPR) like Community Ponds, Temples, other Sacred Centres, Community Halls, Cremation Ground etc. as presented in Table 4.21.The list of temples are given in **Table 4.23**. In terms of CPR, the likely impact from the project development was also discussed with the villagers.

Table 4-23: Village Wise Common Property Resources[42]

Study Area Villages	Common Property Resources (CPR)			
	Community Ponds	Cremation Ground	Community Hall	Canal
Korampally	2	2	-	-
Yelakurthy	1	5	1	1
Salojipally	-	1	1	-

Note: In each of the villages there are more than one cremation grounds meant for different caste.

Archaeology sites in the District and study area

As per the Archaeological Survey of India (ASI) Medak is a rich resource of Archaeological Sites and Cultural Heritage. A list of archaeologically and culturally important monuments is appended here in **Table 4.24**. No ASI identified monument or similar structure is present within the study area villages, viz. Korampally, Yelakurthy and Salojipally villages.

Table 4-24: List of Monuments in Medak[43]

Sl.No	Name of the Monument	Village	Mandal	Period
1	Hill Fort (Built by Rajas of Warangal)	Medak	Medak	14th —15th C.A.D
2	Mubarak Mahal	Medak	Medak	16th C.A.D
3	Qutub Shahi Mosque, Arab Khan Mosque and Inscriptions	Medak Fort	Medak	17th C.A.D
4	Inscriptions(Inscription carved on a Granite Slab)	Medak	Medak	16th C.A.D
5	Hindu Temples & Inscriptions	Kondapaka	Kondapaka	13th C.A.D
6	Stone Circles	Attapur	kalabgur	10th -9th C.A.D
7	Proto-Historic Burials	Kasipalli	Kalabgur	10th C.B.C.

[42] *Source: Primary Consultation at Study Area Villages*

[43] *Source: http://telanganamuseums.in/monuments-in-medak.html*

Sl.No	Name of the Monument	Village	Mandal	Period
8	Remains of Hindu Temples and Tombs	Patancheru	Patancheru	12th -15th C.A.D
9	Jaina Temples	Patancheru	Patancheru	13th C.A.D.
10	Ruined Tombs	Siddipet	Siddipet	16th C.A.D
11	Proto -Historic Burials	Ponnal	Siddipet	10th C.B.C
12	Proto -Historic Burials	Assany_alli	Kulcharam	10th C.B.C
13	Cairns	Merpadge	Kondapak	10th C.B.C
14	Old Mosque	Komatoor	Medak	17th C.A.D
15	Qutub Shahi Mosque	Andole	Andole	17th C.A.D
16	Cairns	Burgapalli	Yellareddi	10th C.B.C
17	Rakasigudi	Mandapally	Chinnakodur	10th C.B.C
18	Rakasigudi	Palamkul	Siddipet	10th C.B.C
19	Rakasigudi	Nermetta	Nanganoor	10th C.B.C.
20	Rakasigudi	Pullur	Nanganoor	10th C.B.C
21	Siva Temple	Duddeda	Kondapaka	13th C.A.D
22	Sri Ramalingeswara Swamy Temple	Nandikandi	Sadasivapet	12th C.A.D
23	Subedar Office Building	Patancheru	Patancheru	19th C.A.D
24	Kasivisweswaralayam	Kalbagur	Sangareddy	12th C.A.D
25	Ancient Temple	Edithanur	Sangareddy	13th C.A.D
26	Sri Venkateswara Rukmini Panduranga Temple	GadiMohalla	Zaheerabad	17th 18th C.A.D
27	Sri Rechanna Swamy Temple	Badampet	Kohir	18th 19th C.A.D
28	Sri Sangameshwar Temple	Mogudampally (Upparpallytanda)	Zaheerabad	17th 18th C.A.D
29	Sri Kuchadri Venkateswara Swamy Temple	Kuchanpalli	Medak	
30	Sri Basaweshwara Swamy Temple	Jharasangam	Jharasangam	
31	Sri Trilingeswara Alayam	Yellareddypet	Thoguta	

Source: http://telanganamuseums.in/monuments-in-medak.html

Cultural and historical heritage in the district

Ancient Fort & Watch Tower at Andole Village

One fort like Structure is found to be located on Sangareddy- Medak Road at Andole village under Andole Mandal of Medak District about 16.23 Km. south from the Project Area. There is one Tower like structure is also found adjacent to the fort like structure, According to the villagers that it was used as Watch Tower in the time of yore. One Temple is found located within the mentioned fort. A local deity namely Sri Ranganatha is worshipped till date within the Temple. It was informed by the local people that the structure was said to be built by local chieftain ***Queen Shankaramma*** approximately on 1712 AD.

Fort Entrance Gate remnant on Sangareddy-Medak Road, (Andole Village)

Shops closely located to the Watch Tower located adjacent to the Fort

Celebration House & Ranganatha Temple (within Fort Complex)

A newly built Celebration House is seem built at the northern entrance of the Temple of the Fort. Local villagers informed that it was built by the local MLA by the Local Area Development (MLA LAD) fund.

As the said building period of the Fort goes back to Sultanate Period and as given above same kind of such instances are evident in different areas of the District, Chance Find Procedure could be applied under PS 8 of IFC to ensure whether alike remnants of old civilization similar to the Fort are possible to be unearthed within the close proximity of the Project Area. Though, no such evidential proof was found in the site area villages.

So far it was informed that there is no designated or non- designated heritage site in the study area villages of the project area. However, instances of the establishments of Cultural and Religious importance is noticed in the study area villages viz. Korampally, Yelakurthy and Salojipally are given in the following **Table 4.25.**

Table 4-25: Village Wise Cultural and Sacred Places

Study Area Villages	Religious and Cultural Place
Korampally	1 Anjaniswami Temple (Hanuman Temple)
	1 Durga Temple
	1 Veerappa Temple
	1 Pochamma Temple
	1 Malanagudu Temple
Yelakurthy	1 Anjaniswami Temple (Hanuman Temple)
	1 Durga Temple
	1 Veerappa Temple
	1 Mosque

Study Area Villages	Religious and Cultural Place
Salojipally	1 Anjaniswami Temple (Hanuman Temple)
	1 Durga Temple
	1 Mosque
	1 Church

Anjaniswami (Hanuman) Temple at Yelakurthy

Mosque at Yelakurthy village

Durga Maa Temple at Salojipally

Church at Salojipally

It is to note here, that a few graves are found near Yelakurthy Village Site area. This need to be taken care of during construction of facilities and following the Principles of Asian Development Bank (ADB) it should be informed to the land owners and get relocated by themselves with due respect and dignity at a suitable area beyond the site area.

4.5.14 Government Schemes in District

A few Govt. schemes that are on ground as per Telangana Govt. Schemes' website[44] are appended here below.

[44] *https://www.telanganastateinfo.com/telangana-govt-schemes/*

A. ***Grama Jyothi programme***[45]

The **objective of the Grama Jyothi programme** was to strengthen the panchayat raj system, making gram panchayats active participants in development schemes and preparation of plans at village-level on their own

B. Telangana Ku Haritha Haram Scheme

Telangana Ku Haritha Haaram, a flagship programme of the Telangana Government envisages to increase the present 24% tree cover in the State to 33% of the total geographical area of the State. The thrust areas to achieve the above are two-fold; one, initiatives in notified forest areas, and the other, initiatives in areas outside the notified forest areas.

The first objective is sought to be achieved by a multiprocessing approach of rejuvenating degraded forests, ensuring more effective protection of forests against smuggling, encroachment, fire, grazing and intensive soil and moisture conservation measures following the watershed approach.

Major fillip is sought to be given to Social Forestry for achieving the second objective. In the areas outside the notified forest, massive planting activities will be taken up in areas such as; road-side avenues, river and canal bank, barren hill, tank bunds and foreshore areas, institutional premises, religious places, housing colonies, community lands, municipalities, industrial parks, etc. Legend District Boundary Vegetation Class Dense Forest Open Forest Scrub Non Forest Water Body.

230 Crore seedlings are proposed to be planted in the State during the next three years. Out of this, 130 crores seedlings are proposed to be planted outside the notified forest areas (10 crore within HMDA limits, and the remaining 120 Crores in rest of the State). It is also proposed to plant, and rejuvenate the viable rootstock to achieve 100 crore plants inside the forest areas by way of intensive protection of the forests.

C. Mission Kakatiya to renovation ponds in Telangana[46]

Mission Kakatiya with tagline of "*Mana Vooru Mana Cheruvu*" along with the programme title has been launched by the Chief Minister of the State during March, 2015. There are Totally 45,000 ponds in Telangana state in these 1500 ponds are estimated to renovate soon, and About 9,000 ponds will be restored every year under this programme. The district wise details for *Mission Kakatiya* is given in **Figure 4.15.**

[45] *Source: http://www. tspri.cgg.gov.in/*

[46] *Source: https://www.telanganastateinfo.com/mission-kakatiya-to-renovation-ponds-in-telangana/*

Figure 4-15: District wise details of Mission Kakatiya Programe

District-wise details		
District	Tanks taken in 1st phase	Ayacut (acres)
Adilabad	790	2,79,215
Karimnagar	1188	2,77,005
Warangal	1168	3,55,287
Khammam	903	2,53,451
Nizamabad	650	1,71,390
Medak	1588	3,22,553
Ranga Reddy	570	1,93,223
Mahabubnagar	1496	3,03,828
Nalgonda	952	3,58,044

D. *Telangana Water Grid Project*[47]

The Telangana State Govt. has proposed to build a Telangana Water Grid Project Plan in the state. This project aim to supply drinking water needs of all the towns and villages in the state. The proposed pipeline would have 5,227 kms of main trunk line, 45,809 kms of secondary network and 75,000 kms of distributary network. As per the Govt. declaration, the Grid will use 160 TMC ft (thousand million cubic feet) water with 80 TMC ft. each from Godavari and Krishna rivers. All ongoing drinking water projects will be integrated into the proposed project. The chief minister announced that 10 percent of water from all existing and new irrigation projects will be allocated for the grid and another 10 percent for industry.

E. *Telangana Kalyana Lakshmi Pathakam (Scheme) for SC, ST Brides*[48]

In the G.O. No.12, SCD (POA.A1) Dept., dated: 24.09.2014., orders were issued introducing the scheme of "Kalyana Lakshmi Pathakam" to all SC and ST unmarried girls on their marriage with a view to alleviate financial distress in the family under the Scheme, a onetime financial assistance of Rs.51, 000/- at the time of marriage shall be granted to every SC/ST Girl with effect from October 2, 2014. In Partial modification of the orders issued in the G.O. read above, Under the Scheme, a onetime financial assistance of Rs.51,000/- shall be granted to every SC/ST Girl before the marriage provided an application is submitted at least one month in advance from the date of marriage .

F. *Shadi Mubarak Scheme for Muslim Brides in Telangana*[49]

The Government of Telangana state *Shadi Mubarak Scheme* for Muslim Brides in Telangana state. For this scheme all Telangana Muslim minorities get benefits for this scheme. The main aim of the scheme is to decrease burden over Muslim Brides minorities. Vide Government Notification Reference No. *1)*

[47] *Source: http://www.telangana.gov.in/news/2014/12/15/water-grid*

[48] *Source: https://www.telanganastateofficial.com/kalyana-lakshmi-pathakam-scheme*

[49] *Source: http://www.telangana.gov.in/government-initiatives/shaadi-mubarak*

G. O.Rt. No. 340 Minorities Welfare (Wakf- III) Department, dated 21-07- 2008 and 2) G.O.Rt. No. 123 Minorities G. Welfare (Wakf- III) Department, dated 24-04-2012 Government of Telangana has enabled a scheme for conducting mass marriages of poor Muslim girls in the State. The Government of Telangana has reviewed the performance of the said scheme and after detailed examination and in supersessions of all orders issued on the above subject hereby introduce the scheme of "Shaadi Mubaarak" for all unmarried girls belonging to the minority community at marriage, with a view to alleviate financial distress in the family. Under the Scheme, a onetime financial assistance of Rs. 51,000/- at the time of marriage shall be granted to every unmarried girl belonging to the minority community with effect from October 2, 2014.

G. Mahatma Gandhi National Rural Employment Guarantee Scheme-

At least one hundred days of guaranteed wage employment in every financial year to every household whose adult members volunteer to do unskilled manual work are being ensured with this scheme.

The National Rural Employment Guarantee Act (NREGA) was passed by Parliament in September 2005. Under this scheme 20021 Job Cards were issued and about 325 individuals are working under this scheme since inception till August, 2016 in Medak District.[50] As per the scheme average wage rate per day per person is Rs. 129.51 in present financial year (FY 2016-17). But no evidence for MGNREGA has been sought in the project area villages during consultation. Neither any such information is available in website portal.

H. Rural Employment Generation Programme (REGP)-

On the basis of recommendation of the High Power Committee report, submitted in May 1994, headed by the then Prime Minster of India, the KVIC launched Rural Employment Generation Programme (REGP) with effect from 1st April, 1995 for generation of two million jobs under the KVI sector in the rural areas of the country. The term rural areas has been defined under the KVIC Act, 1956 as under:

Any area classified as village as per the revenue records of the state, irrespective of population. It also includes an area classified as town, provided its population does not exceed 20,000 as per 1991 census.

Similarly, the term village industries has been defined as "any industry located in rural area which produces any goods or renders any service with or without the use of power and in which the fix capital investment per head of artisan or worker does not exceed Rs. 50,000 or such other sum as may be specified by Central Government from time to time". All activities which do not appear in the negative list circulated by KVIC are eligible for financing under the scheme.[51]

I. Prime Minister's Employment Generation Programme (PMEGP)[52]-

Government of India has approved the introduction of a new credit linked subsidy programme called Prime Minister's Employment Generation Programme (PMEGP) by merging the two schemes that were in operation till 31.03.2008 namely Prime Minister's Rojgar Yojana (PMRY) and Rural Employment Generation Programme (REGP) for generation of employment opportunities through establishment of micro enterprises in rural as well as urban areas. PMEGP will be a central sector scheme to be administered by the Ministry of Micro, Small and Medium Enterprises (MoMSME). The Scheme will be implemented by Khadi and Village Industries Commission (KVIC), a statutory organization under the administrative control of the Ministry of MSME as the single nodal agency at the National level. At the State level, the Scheme will be implemented through State KVIC Directorates, State Khadi and Village

[50] *Source: http://www.nrega.telangana.gov.in/Nregs/*

[51] *Source: http://ari.nic.in/ari_regp.htm*

[52] *Source: http://industries.telangana.gov.in/Library/About Pmegp.pdf*

Industries Boards (KVIBs) and District Industries Centres (DICs) and banks. Telangana State is inline on promotion of this scheme.[53]

J. Arogya Lakshmi Scheme[54]-

The *Arogya Lakshmi Scheme* meant for the welfare of the pregnant and lactating women came into vogue. As declared by the Chief Minister the programme would provide one nutritious meal every day through Anganwadis to pregnant, new mothers and infants. The programme is being implemented since January, 2015 through 31,897 Anganwadis and 4,076 mini Anganwadis in Telangana State.

K. Child Development Schemes-

- ***Immunization of Children*** under National Rural Health Mission (NRHM) launched in the year 2005, Immunization programme is a separate component 'C'. BCG, DPT and Polio are part of this component. This programme is being monitored by the Health Department at individual household level in the project area villages.

Integrated Child Development Services is a 100% Centrally Sponsored scheme under which six services i.e. supplementary nutrition, pre-school education, immunization, Health Checkup, Health and Nutrition Education and referral services are provided to the Children in the age group of 0-6 years, pregnant women & lactating mothers. Anganwadi Centres has been seen and interaction with Anganwadi Workers have been made on this scheme at the Project area villages.

L. Government Initiatives - Social Security Schemes-

i. Telangana Aasara Pension Scheme55 :

Eligibility of Telangana Aasara Pension Scheme is common to all Pension Schemes offered by the Govt.

i. The proposed beneficiary shall be from BPL family.

ii. He/she shall be a local resident of the district.

iii. He/she are not covered under any other Pension Scheme.

ii. Housing for BPL Families[56]

Telangana State Housing Corporation Limited (TSHCL) aims to bring dignity to each and every BPL family by assisting them, both financially and technically, for construction of permanent (Pucca) houses. The financial assistance is provided as per the various schemes of State Government and Government of India

Housing for them, both financially and technically, for construction of permanent (Pucca) houses. The financial assistance is provided as per the various schemes of State Government and Government of India

iii. MeeSeva Services[57]

"MeeSeva" in Telugu means, 'At your service', i.e. service to citizens. The objective of MeeSeva is to provide smart, citizen centric, ethical, efficient and effective governance facilitated by technology. The initiative involves universal and non-discriminatory delivery of all government services to citizens &

[53] *Source: http://industries.telangana.gov.in/selfemployment.aspx*

[54] *Source: https://www.telanganastateofficial.com/arogya-lakshmi-scheme-complete-details*

[55] *Source: http://www.aasara.telangana.gov.in/SSPTG/userinterface/portal/*

[56] *Source: http://tshousing.cgg.gov.in/*

[57] *Source: http://www.telangana.gov.in/services*

Businessmen of all strata and improved efficiency, transparency and accountability for the government. The initiative features transformed government - citizen interface at all levels of administration along with a shared governance model.The Project brings in a digital PKI enabled integrated architecture through multiple service delivery points by fusing in the various pre-existing state initiatives with the Mission- mode Projects like State Data Center (SDC), State Wide Area Network (SWAN) and Common Service centers (CSCs) of the National eGovernance Plan (NeGP) of Government of India

M. INDIRAMMA (Integrated Novel Development in Rural Areas and Model Municipal Areas):

The INDIRAMMA scheme is intended to provide basic amenities to one-third of villages and one-third of wards in the urban areas. The ex-Chief Minister of Andhra Pradesh Late Dr. Y.S. Rajasekhar Reddy launched the historic INDIRAMMA programme to create a novel rural/urban Andhra Pradesh through development of villages and municipalities in an integrated manner. Government has been implementing many programmes over the years for development of infrastructure and on individual welfare. Andhra Pradesh Government has taken a decision to take up development of model villages and towns with an intention to saturate certain identified basic needs of the people and the village/town Infrastructure In an integrated and focused manner. This is planned to be achieved in a period of three years. This new model of development is named as "INDIRAMMA" (Integrated Novel Development in Rural Areas & Model Municipal Areas) to fulfill the dreams of our former Prime Minister, Smt, Indira Gandhi. The objective of this programme is to saturate the basic needs in respect of the identified activities in all the Villages and Towns over a period of Three years. The primary aim of this programme is to provide in every village pucca houses, drinking water supply, individual sanitary latrines, drainage, power supply to every household, Road facilities for transport, pensions to eligible old age persons, weavers, widows and the disabled, primary education to all, special nutrition to adolescent girls/pregnant and lactating women and better health facilities in all the villages over a period of three years in a saturation mode, This shall improve the living standards of the people significantly. This programme will be taken up in all the mandals simultaneously. Taking up Gram Panchayats covering one third of the population in the mandal every year, all the Gram Panchayats will be covered over a period of three years. 8026 Gram Panchayats have been selected for the first phase of the programme starting on 1st April 2006 and the remaining Gram Panchayats will be covered during subsequent two years. Government is ready to launch the programme from 1st April 2006 and Gram Sabhas will be held in the selected Gram Panchayats from 6th February 2006 to give details of the specific activities to be taken up in the village under the programme.

N. Under the Telangana State Development Planning – A subsidiary of the Planning Commission is a restructured specialized body created for analyzing data, the following programmes are on board and running at present

- **Twenty Point Programme:–**

TPP refers to a set of socio-economic schemes delivered by states for the welfare of weaker sections. Started in 1975, the TPP monitors performance of 20 vital schemes implemented by both the Central and State governments. The schemes under TPP-2006 are in accordance with the priorities contained in the National Common Minimum Programme (NCMP), the Millennium Development Goals (MDGs) of the United Nations and SAARC Social Charter. The 20 points and 66 items which are monitored individually by different Central Nodal Ministries covers various socio-economic aspects like poverty, employment, education, housing, health, agriculture, land-reforms, irrigation, drinking water, afforestation, environment protection, energy to rural areas, welfare of weaker sections of the society and e-governance etc. AP has been in the forefront of implementation of the programme, ***and*** was ranked 9th (2009-10) and 1st in the country in 2010-11. The Planning Department is the nodal agency at the State level and reviews the programme ***every*** month with the departments concerned and ranks the districts based on their annual performance.

- **Constituency development programme :-**

Data collection and analysis have been mostly used for arriving at trends and in making and monitoring policies by researchers and government departments. Demographic, Economic, Sector Wise, Scheme wise data is available from varied inputs and is generally collated by the Planning Department to assist in its plans and policies. This data reaches public domain in the form of varied documents like the Statistical Abstract, Socio-economic Survey, District handbooks and other types of publications and reports. Sensing the need to create data base which can be used by political representatives in understanding the issues of concern, performance of schemes in their constituencies, and the areas that need to be focused upon, the Planning Department of AP initiated putting the existing data in a constituency wise format.

To capture the pace of development at Assembly Constituency level, the Planning Department put together data on few indicators like Education, Health, ICDS, Housing, Flagship Programs, Rachhabanda, and Funds availability and the Millennium Development Goals (MDGs) target to be achieved by 2015. MLAS from all parties, District Collectors and allied functionaries were given the prepared information and to facilitate information aided discussion process at district / sub district levels and take the district administration on systematically triggered high growth mode of functioning.

- **Member of Parliament Local Area Development Scheme (MPLADS):**

In 1993-94, MPLAD Scheme was launched, an amount of Rs. 5 lakh per Member of Parliament was allotted which became Rupees one crore per annum per MP constituency from 1994-95.This was stepped up to Rs. 2 crore from 1998-99 and now it has been increased to Rs.5 crore from the financial year 2011-12.

Under this scheme, each MP has the choice to suggest to the District Collector for, works to the tune of Rs.5 Crores per annum to be taken up in his/her constituency. The Rajya Sabha Member of Parliament can recommend works in one or more districts in the State from where he/she has been elected. The Nominated Members of the Lok Sabha and Rajya Sabha may select any Districts from any State in the Country for implementation of their choice of work under the scheme. The objective of the scheme is to enable MPs to recommend works of developmental nature with emphasis on the creation of durable community assets based on the locally felt needs to be taken up in their Constituencies. Right from inception of the Scheme, durable assets of national priorities viz. drinking water, primary education, public health, sanitation and roads, etc. are being created.

- **Flagship programme:-**

Government has initiated a number of welfare programs to translate its promises to the people for socially just and inclusive growth. Certain ongoing programs were consolidated or altered to increase their efficiency and certain new programs were initiated in important areas like employment, health, education, rural infrastructure, urban renewal and providing people a legal framework for the Right to Information.

1. ***Sarva Shiksha Abhiyan:*** It is an ongoing programme for universalisation of elementary education, was consolidated by providing additional financial allocations and creation of a dedicated *Prathmik Shiksha Kosh* through a 2% cess introduced for the first time. The provision of cooked mid-day meal was universalised.
2. ***National Rural Health Mission:*** This mission is to move from vertical disease management programmes to comprehensive healthcare. This has been achieved through an intersectoral district health plan, which provides for a community health activist in each village, untied funds to all sub-health centres and improvement of infrastructure and standards in rural hospitals.
3. ***Jawaharlal Nehru National Urban Renewal Mission:*** This represents the first effort of its kind where Government of India is intervening in a major way to improving the quality of living in the

cities. It focuses on improving urban infrastructure, governance and services to the urban poor. Comprehensive city development plans are prepared and funded under this Mission.

4. ***Bharat Nirman*** has been a major initiative conceived as a time-bound plan for rural infrastructure. It seeks to provide electricity to all remaining villages, drinking water supply to all uncovered and slipped-back habitations, connect all habitations with a population of 1000 (500 in hilly and tribal areas) with an all-weather road, create additional irrigation capacity of 1 crore hectares, build 60 lakh houses for the rural poor and cover every village with a telephone.
5. ***NREGA*** provides a legal guarantee for 100 days of work to rural households. The programme now covers all rural districts of the country. It is the first such effort in the world to provide legal guarantee for a Right to Work and the programme is being keenly watched by development observers all over the world.
6. ***Right to Information Act:*** This act was passed in 2005. This Act is being used actively by the citizens, leading to greater transparency and accountability in public life. As the outcomes of the flagship programmes consolidate over the next few years, a new era of equalising and socially inclusive growth would become a reality.

- **Millennium Development Goals :-**

Reforms initiated in the 1990's to a large extent have made a positive impact on Economic development in the state. However it lags behind on several other socio-economic and human develop indicators. AP stands in the middle on the performance of a number of MDG goals in the country. Achieving all the MDG set targets in the stipulated time is a challenge that AP has to seriously start focusing upon, as the date of delivery draws close. Being on track on a number of indicators, AP is poised to achieve a large proportion of the MDGs. To keep track of AP's status quo on a number of parameters, it is essential to have an idea of the exact targets set for the state. Taking in to account the base line data figures of the nineties AP MDG targets have been quantified by a number of scholars. Few common arrived targets, and the current conditions on a number of parameters is collated to create a more broader and accepted table that contains the recognized MDG targets set for the state, and APs current position on the different indicators of MDGs. The tabular form of this is prepared to assist targeted policy interventions.

O. Some irrigation schemes in Telangana

The development of Irrigation in Telangana is mostly dependent on Godavari & Krishna Rivers and their tributaries, Tanks & Ponds. Tanks are the most important resources of Telangana. There are 46,531 Nos of water bodies varying from very large tanks to small ponds & percolation tanks. Restoration & Renovation of tanks has been taken by Irrigation &CAD Department under Mission Kakatiya, a flagship programme of Government of Telangana at 20% tanks every year.

Irrigation & CAD Department is entrusted with Survey, investigation, planning, designing, construction, maintenance and management of Major, Medium & Minor Irrigation Projects including Lift Irrigation Schemes. Further Quality Control mechanism, is also proposed to strengthen by providing one Quality Control Division for each District. Central Design Organization of I&CAD Department is also strengthened to take the designs of all the projects to meet the requirements of newly proposed and re-engineering projects.

Telangana has two major river basins namely Krishna River Basin & Godavari River Basin. I&CAD Department is striving hard for planned utilization of 961.60 TMC and 298.96TMC of water in Godavari and Krishna basins, apart from flood waters in Krishna basin. In this regard, basin wise Hydrology and Investigation wings have been created to meet the requirements of Hydrology Project-III (World Bank funded)

Telangana region has a rich heritage of cultivation and irrigation dating back to several centuries. In the past, rulers paid a good deal of attention to the development of irrigation in their kingdoms for the benefit of their subjects. Big lakes like Ramappa, Pakhal, Laknavaram and many other irrigation works of Kakatiya period have become names to remember.

The Mir Alam Tank is the finest example for arched dams. Hussain Sagar, Ghanapur Anicut across the Manjira with two canals called Fathenahar and Mahaboobnahar Projects, Pocharam Lake, Osmansagar, Himayatsagar, Nizamsagar Project, Mannair Project, Dindi Project, Palair Project, Wyra Project and Sarlasagar Projects are some of the magnificent contributions of the eminent Engineers of Hyderabad State under Nawab Ali Nawaz Jung Bahadur during the Nizam's kingdom in the Telangana Region.[58]

Projects are classified as under, based on the extent of irrigated ayacut (commandable area) under them.

Major Project	Ayacut above 25000 Acres (10,000 ha.)
Medium Project	Ayacut above 5000 Acres (2000 ha) & up to 25000 Acres (10000 ha.)
Minor Project	Ayacut up to 5000 Acres (2000 ha)

The Telangana government has focus to complete the 33 No of Major & Medium Irrigation ongoing and proposed projects on River Godavari on top most priority and also restoration of Minor Irrigation tanks.

The Total Irrigation Potential is given in **Table 4.26**.

Table 4-26: Telangana State Irrigation Potential[59]

Created so far up to 03/2014	52.95 lakh acres (under Major, Medium and Minor irrigation including IDC sectors)
Irrigation Potential to be created in 2014-15	6.17 lakh acres (under Major and Medium Irrigation)
Irrigation Potential to be created in 2015-16	6.71 lakh acres (under Major and Medium Irrigation)
Irrigation Potential to be created in 2016-17	9.25 lakh acres (under Major and Medium Irrigation)
Irrigation Potential to be created in 2017-18	3.20 lakh acres (under Major and Medium Irrigation)

4.5.15 Stakeholder Consultation

Consultation with land owners and community members were held separately at each study area villages. Consultation was carried out with representative of Project Proponent, Land Owners, Land Aggregators, Village Panchayat Members, Anganwadi Workers, and other Community Members from Korampally, Yelakurthy and Salojipally villages. Outcomes of the consultations are included in the above sections such as infrastructure, migration, occupation etc. The date of meeting with different Stakeholders consulted in study area villages is provided in **Table 4-27.**

Table 4-27: Consultation with Different Stakeholders

Stakeholder type	Designation	Department/Address	Date
Community	Villagers/ Farmers	Korampally	18/08/2016
	Villagers/ Farmers	Yelakurthy	18/08/2016
	Villagers/ Farmers	Salojipally	19/08/2016

[58] *Source: http://www.telangana.gov.in/departments/irrigation-and-cad*

[59] *http://www.telangana.gov.in/departments/irrigation-and-cad*

Stakeholder type	Designation	Department/Address	Date
Land Owners	Land Owners	Korampally	18/08/2016
		Yelakurthy	18/08/2016
		Salojipally	19/08/2016
Local Govt. Institution	Sub Registrar	Jogipet	19/08/2016
	Dy. Sarpanch & Panchayat Members	Korampally	18/08/2016
	Panchayat Members	Salojipally	18/08/2016
	Ex- Sarpanch	Salojipally	19/08/2016
	Anganwadi Worker		
	Teachers		
Land Aggregator	Land Aggregator	Korampally, Yelakurthy and Salojipally	18/08/2016- 19/08/2016
Project Proponent & Developer	Project Site Manager	ReNew Saur Shakti Private Limited	18/08/2016- 19/08/2016
Project Proponent & Developer	Representative	ReNew Saur Shakti Private Limited	19/08/2016

Source: primary consultation

Consultation with Project Site Manager (ReNew Saur Shakti Private Limited)

The Project Site Manager of the project proponent has informed the visiting ESIA Team that the land procurement process, in two of the project area villages viz.120 Acres and 200 Acres at Yelakurthy, and Korampally village is almost completed. And the 125 Acres Land of Salojipally village is yet to be finalised. As informed by them the capacity breakup of each distinct Solar Power Plant is yet to be decided. He also informed that NOC the respective Village Panchayats is also to be procured at respective villages.

It was also informed by them, as per Central Pollution Control Board issued a notice, vide **CPCB notification No. B-29012/ESS(CPA)/2015-16; dated March 07, 2016** for White Category Projects there is exemption in Consent to Establish (CTEs) and Consent to Operate (CTOs) irrespective of the capacity. Hence, no CTE is required for the 65MW_{AC} Project Plants to be spread at 3 villages, viz. Korampally, Yelakurthy and Salojipally at Tekmal Mandal in Medak district. The exemption notifications is attached herewith in **Appendix B.**

Consultation with Land Aggregator for Korampally, Yelakurthy and Salojipally

Land Aggregator for all the three village site area, viz. Korampally, Yelakurthy and Salojipally is being headed by Mr. Prasad. However, he was unavailable and consultation was done with his representative Mr. Kandipally Manaya. Consultation meeting was held with the Land Aggregator at three different villages. As informed by the Land Aggregator, they have individually approached to land owners during land procurement process. Sale Agreement has been finalised with the Land Owners in these two villages.

All the required private lands for each project has been and in the process of procurement (for Plants and access roads) on the basis of Sale Agreement. PoA (Power of Attorney) has been obtained from most of the land owners. Sale agreement for the rest is underway. Bore wells form a source of irrigation. As informed due to the escalating cost for cultivation and rising labour cost, profit from Agriculture is gradually declining. There are also emergency needs of Finance for different personal purpose like Children's Education, Marriage etc. Hence, the farmers and land owners were trying to look for more ensured profiting and supporting resource options.

Consultation with Sub registrar at his Office at Jogipet

As informed by the sub registrar at his office in Jogipet, and also during consultation it was revealed the land owners and land aggregators at the site area that the land sold by landowners are at higher price than the circle rate. The circle rate details in the proposed project area is provided in **Table 4.28.**

Table 4-28: Govt. Circle Rates of land[60]

Sl. No.	Village Name	Circle rate/Acre (INR)	
		Dry Land	Fertised Land
1	Korampally	Rs. 90000.00	Rs. 1,50000.00
2	Yelakurthy	Rs. 1,10,000.00	Rs. 1,50,000.00
3	Salojipally	Rs. 1,50,00.00	Rs. 1,60,00.00

Source: Consultation with Sub Registrar at his office in Jogipet

Consultation with Community, Panchayat Members and Dy. Sarpanch

Korampally Village

As informed during consultation, Korampally village has population of around 3000 (as per Census, 2011 it was 1381). As informed by the community and panchayat members 20% of whom are SC (As per Census, 2011 it was 16%). As informed the around 90% of the total population are involved in cultivation activities either as cultivators or agricultural labourers. But the Census, 2011 states that around 52% are involved in agricultural activities directly. 10% are either having small business like grocery, small shops etc. or work as masons and carpenters etc. in the nearby urban areas and work seasonally. Only a very few go in the Service Sector. Livestock rearing also another source of livelihood for some. The main crop cultivation are of Rice, Moong, Tur (Bengal Gram), Sugar Cane, Jowar, Corn etc. It was informed that though Cotton was cultivated previously in large scale, but since the closely located spinning mill units are gradually closing down, the cultivation also got declined. Agriculture is both rain fed and irrigated. People of this village avails water from Rain during Monsoon, Bore wells and through channel from Manjira River located within 2.5 Km from the village. There is a centrally located Overhead Water Tank maintained by the Panchayat under Comprehensive Protected Water Supply Scheme and distributed through piped line at individual household level. It is the main source of drinking water but the ground water depth is more than 60 ft. A few scattered and isolately located Hand Pumps are also seen. But, as informed by the community members they remained inactive most of the period of the year. The village has only one Elementary School. For higher education students either go to nearby Salojipally and further to Tekmal or Jogipet to pursue and continue education. Sanitation is at a serious state. In this village only 50 % of the households have Sanitary Latrines at their households. Rest of the population resort to open defecation. There is no health care facility in the village. People normally go to Tekmal to avail one Health Sub centre there, which is more than a Km from the village or at Jogipet, about 14 Km from the area, to avail hospital facilities. A few unregistered quack doctors are also availed by the villagers in times of emergency. Health workers visit the village twice/ month for health related monitoring, routine immunisation and vaccination. Emergency No. 104 and Ambulance Service No. 108 is also availed during the times of need. Average land holding size is about 5-7 acre per household in the village. A very few of the villagers have technical skills or training.

It was informed by the Panchayat Members that they are aware of the 65MWAC Solar Power project to be started in the village. Some of the Panchayat Members are Land providers as well. As informed earlier NOC from the Village Panchayat is yet to be procured at respective villages. The community

[60] *Source: Consultation with Sub Registrar at his office in Jogipet*

also is aware of the upcoming Solar Power Project and expecting betterment in their livelihood with the initiation of the same.

Yelakurthy Village

As informed by the community members at Yelakurthy village has population of around 2500, whereas in Census, 2011 the number was 1622. As informed by the community and panchayat members 20% of whom are SC. There are also a handful Muslim and Christian families. As informed the around 90% of the total population are involved in cultivation activities either as cultivators or agricultural labourers. But the Census, 2011 states that around 78% are involved in agricultural activities directly. As informed, around 10% are either having small business like grocery, small shops etc. or work as masons and carpenters etc. in the nearby urban areas and work seasonally. Only a few (around 10%) go in the Service Sector. Livestock rearing also another source of livelihood for some. The main crop cultivation are of Rice, Moong, Tur (Bengal Gram), Sugar Cane, Jowar, Corn etc. It was informed that though Cotton was cultivated previously in large scale, but since the closely located spinning mill units are gradually closing down, the cultivation also got declined. Agriculture is both rain fed and irrigated. People of this village avails water from Rain during Monsoon, Bore wells and through channel from Manjira River located within a Km from the village. During the time of visit a new Trench was found on the making at close proximity to the Project Site. There is a centrally located Overhead Water Tank maintained by the Panchayat under Comprehensive Protected Water Supply Scheme and distributed through piped line at individual household level. It is the main source of drinking water but the ground water depth is more than 60 ft. A few scattered and isolately located Hand Pumps are also seen. But, as informed by the community members they remained inactive most of the period of the year. The village has only one Elementary School and a High School up to standard 10th. For further higher education students either go to nearby Salojipally and further to Tekmal or Jogipet to pursue and continue education. Sanitation is at a serious state. In this village only 50 % of the households have Sanitary Latrines at their households. Rest of the population resort to open defecation. There is no health care facility in the village. People normally go to Tekmal to avail one Health Sub centre there, which is more than a Km from the village or at Jogipet, about 17 Km from the area, to avail hospital facilities. A few unregistered quack doctors are also availed by the villagers in times of emergency. Health workers visit the village once/ 8 days for health related monitoring, routine immunisation and vaccination. Emergency No. 104 and Ambulance Service No. 108 is also availed during the times of need. Average land holding size is about 5-7 acre per household in the village. A very few of the villagers have pursued for higher education and have technical skills or training.

It was informed by the Panchayat Members that they are aware of the upcoming 65 MWAC Solar Power project to be started in the village. Some of the Panchayat Members are Land providers as well. The community also is aware of the upcoming Project as well and expecting betterment in their livelihood with the initiation of the same.

Salojipally Village

No information regarding Salojipally village is available in the Census, 2011. As informed during consultation Salojipally has population of around 800. As informed by the community and the ex-Sarpanch around 30% of the total population is SC. Also there are a few Muslim (about 10%) and Christian families (5%). Around 90% population are either cultivators themselves or dependent on agricultural activities. A very (around 5%) are having small business like grocery, small shops etc. A little amount work as labourers in the local Brick Kilns. A very few work as masons and carpenters etc. and work seasonally at closely located Spin Mills at Shankarampet, Lingampally etc. Livestock rearing is the other source of livelihood for some. The main crop cultivation are of Rice, Moong, Tur (Bengal Gram), Sugar Cane, Jowar, Corn etc. It was informed that though Cotton was cultivated previously in large scale, but since the closely located spinning mill units are gradually closing down, the cultivation also got declined. Agriculture is both rain fed and irrigated. People of this village avails water from Rain

during Monsoon, Bore wells and through channel from Manjira River located within a Km from the village. During the time of visit a new Trench was found on the making at close proximity to the Project Site. There is a centrally located Overhead Water Tank maintained by the Panchayat under Comprehensive Protected Water Supply Scheme and distributed through piped line at individual household level. It is the main source of drinking water but the ground water depth is more than 60 ft. A few scattered and isolately located Hand Pumps are also seen. But, as informed by the community members they remained inactive most of the period of the year. The village has only one Elementary School and a High School up to standard 10th. For further higher education students either go to nearby Salojipally and further to Tekmal or Jogipet to pursue and continue education. Sanitation is at a serious state. In this village only 10 % of the households have Sanitary Latrines at their households. Rest of the population resort to open defecation. There is no health care facility in the village. People normally go to Tekmal to avail one Health Sub centre there, which is more than a Km from the village or at Jogipet, about 15 Km from the area, to avail hospital facilities. A few unregistered quack doctors are also availed by the villagers in times of emergency. Health workers visit the village once/ 8 days for health related monitoring, routine immunisation and vaccination. Emergency No. 104 and Ambulance Service No. 108 is also availed during the times of need. Average land holding size is about 5-7 acre per household in the village. A very few of the villagers have pursued for higher education and have technical skills or training.

It was informed by the Panchayat Members that they are aware of the 65MWAC Solar Power project to be started in the village. Some of the Panchayat Members are Land providers as well. As informed earlier NOC from the Village Panchayat is yet to be procured at respective villages. The community also is aware of the upcoming Solar Power Project and expecting betterment in their livelihood with the initiation of the same.

Consultation with Anganwadi Worker

Salojipally Village

Consultation with Anganwadi worker could be done only at Salojipally Village. It was informed by her that the though the village has one Anganwadi Centre the condition need to be upgraded. The enrolment rate in the AWC is between 25 to 30 children. Emergency No. 108 is availed for Ambulance Service by the State Govt. in the village. Children, in the Anganwadi Centres normally sit on Floor Mats. The biggest problem that the AWCs are facing that they don't have exclusive arrangements for drinking water in their centre. They have to fetch water from the Water Tap linked with the above ground reservoir shared in common with the Elementary School. The Anganwadi Worker has also informed that space within her AWC is inadequate to accommodate higher number of children.

As inquired on the status of women the AWW informed that most of the women in the village are housewives or work as house help in the village. Only a few go for higher education and further opt for services.

As the Anganwadi centres in Korampally was found closed and the Anganwadi worker was unavailable due to the holiday for "Rakhi" festival celebration no consultation could made at the villages.

Based on the information gathered from the community and the panchayat member at all the three study area villages, a village wise list of number of Anganwadi Centres is given in the **Table 4.29**.

Table 4-29: Study area Village wise No. of Anganwadi Centres

Study Area Villages	No. of Anganwadi Centres
Korampally	2
Yelakurthy	1
Salojipally	1

Source: Primary Consultation and Site Visit

Consultation with Land Owners

So far as reported till date, out of the 3 sites sale agreement (for 320 Acres) has been finalised at two villages i.e. at Korampally and Yelakurthy village. However, procurement for land in Salojipally (supposed to be 125 Acres) is yet to be finalised. Hence consultation with Land Owners aws doen only at Koampally and Yelakurthy villages.

Korampally Village

Land owners has sold lands directly to ReNew Saur Shakti Private Limited through Land Aggregator appointed by them. So far informed by the representative of the Project Proponent and the Land Owners, the entire land parcel of 200 Acres was procured through Agreement on willing to sale and willing to buy basis. As articulated by land owners the rates given to them are higher than the circle rates of lands of the area. It has been testified by the land aggregator and the sub registrar of lands of the local office. As informed by the land owners due to the escalating cost for cultivation and rising labour cost, profit from Agriculture is gradually declining. Moreover, as informed by the land owner, they also face financial crisis during the time of dire needs like children's higher education or marriage or even for some other graver cause. Hence, the farmers and land owners were trying to look for more ensured profiting and supporting options.

It was informed by them that, the Land aggregator has individually approached to land owners during land procurement process. The land owners also have some aspirations of betterment in their livelihood with the initiation of the 65 MW Solar Power Project in the village.

Yelakurthy Village

Land owners has sold lands directly to ReNew Saur Shakti Private Limited through Land Aggregator appointed by them. So far informed by the representative of the Project Proponent and the Land Owners, the entire land parcel of 120 Acres was procured through Agreement on willing to sale and willing to buy basis. It has been testified by the land aggregator and the sub registrar of lands of the local office. As informed by the land owners due to the escalating cost for cultivation and rising labour cost, profit from Agriculture is gradually declining. Moreover, as informed by the land owner, they also face financial crisis during the time of dire needs like children's higher education or marriage or even for some other graver cause. Hence, the farmers and land owners were trying to look for more ensured profiting and supporting options.

It was informed by them that, the Land aggregator has individually approached to land owners during land procurement process. The land owners also have some aspirations of betterment in their livelihood with the initiation of the 65 MWAC Solar Power Project in the village

Details of Stakeholders consultation has been provided in **Appendix F.**

Key Findings of Consultation

Only private land has been procured for the proposed 65 MW_{AC} Solar Power Project in all the Project area villages viz. Korampally (200 Aces) and Yelakurthy (120 Acres). Land at Salojipally (supposed to be 125 Acres) is on the way of finalization till the time of the visit of the ESIA Team. It is to mention here, that all the proposed project are villages are located at a close proximity in Tekmal Mandal of Medak District. Some notable key findings of different level stakeholder consultation is append below:

- Agriculture is the major livelihood resource of the study area villages and also of the surrounding area. Quiet a notable amount of population is involved in agriculture, a major part of which are labourers.
- The main crops are Paddy, Moong, Sugarcane Jowar and Corn. A specific kind of Fodder is also cultivated which is also boosting for nitrogen rise in the fields.
- Rain-fed as well as Irrigated agriculture pattern both are practiced in project area.

- The main source for Irrigation in agriculture are bore wells and the existing natural canals, linked with Manjira Rivers and also the Bore Wells.
- Female literacy rate is much lower than male literacy rate in all the study area villages.
- Sanitation facilities are inadequate in the villages and some of households practice open defecation.
- Scarcity of water is a serious issue in the study area villages. In general there are scarcity of water, especially potable water. The groundwater depth is more than 60 ft.
- Drinking water facility is not adequate in the project area villages. Bore wells, tanks are the main source of drinking water. At all the study area villages a centrally located above ground Tank of 10000 Litres. A few scattered hand pumps are also located in a few locations.
- There is no health facility within the study area villages and has to rely on local quacks. To avail one minimum health support one has to travel at Tekmal Mandal Town about 1. 7 Km from Korampally, 4.5 Km from Yelakurthy and 2.6 Km from Salojipally village. Apart from these for availing the Govt. Hospital in Jogipet, which is on an average about 17 Kms from the study area villages, there are numerous Private Clinics and Hospitals. Govt. supported Mobile Health Check-up (Vans) units also reported to be visited, but not with regular intervals in the study area villages.
- Though elementary schools are there at Korampally and Salojipally villages' each and One High School at Yelakurthy there are needs of basic amenities like Benches, running water facility etc. in some of the schools. The project proponent may contribute substantially through their CSR activities.
- Fever, Dental problem, joint pain and other general diseases are common problem in the area. There are also a few complaint of Fluoride Contamination in the Water, which subsequently leading towards water borne and fluoride affected health problems. But there are differences of opinion among villagers in this regard.
- Compensation has been paid to land owner who are mostly farmers more than Govt. circle rate based on willing to sell willing to buy basis.
- Till date NOC from Gram Panchayat was yet to be obtained from all the study area villages, viz. Korampally, Yelakurthy and Salojipally.
- Land has been procured through land aggregator directly appointed by ReNew Saur Shakti Private Limited.
- Though local Gram Panchayat, Community and the Land Sellers are aware of the 65 MW AC Solar Power no formal Public Disclosure has been made by the project proponent till the time of the visit of the ESIA Team.

Grievance Redressal Mechanism (GRM)

RSSPL has developed ESMS in line with the requirement of ADB's Social Protection Strategy (2001). This ESMS is applicable on all the projects initiated by Renew Power. It incorporates procedures for lodging of grievances, processing of grievances, resolving grievances and closing of grievances. Also there are GRM Procedures mentioned in ADB's '*Indigenous Peoples Safeguards, A Planning and Implementation Good Practice Sourcebook, Draft Working Document*' revised in June 2013 and in '*Involuntary Resettlement Safeguards, A Planning and Implementation Good Practice, Sourcebook – Draft Working Document'* published in November, 2012.

For the current 65 MW Solar Power Project spread into parcels in three different villages viz. Korampally (200 Acres), Yelakurthy (120 Acres) and Salojipally (125 Acres). Land procurement is almost at completion for Korampally and Yelakurthy. But, Land for Salojipally is yet to be finalised. ReNew Saur

Shakti Private Limited should address issues like, Land, RoW (Right of Way) and other relevant issues by land aggregator (appointed by ReNew Saur Shakti Private Limited) and team.

For other issues, following the above mentioned GRM Policy as enumerated in the ESMS handbook of ReNew Saur Shakti Private Limited (RSSPL) and following the ADB guidelines should be implemented by RSSPL through its grievance redressal system on site.

However, it must be ensured that:

- The grievance mechanism should be scaled to the risks and adverse impacts of the project.
- It should address affected people's concerns and complaints promptly, using an understandable and transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution.
- The mechanism should not impede access to the country's judicial or administrative remedies. And
- The affected people will be appropriately informed about the mechanism.

Community Development Plan under CSR

Companies Act, 2013 has introduced mandatory Corporate Social Responsibility Regulations which are effective from 1st April, 2014. Section 135 of the Companies Act, 2013 ('the Act'), read with Companies (Corporate Social Responsibility Policy) Rules, 2014 ('CSR Rules') requires every company having:

- net worth of Rs.500 crore or more; or
- turnover of Rs.1,000 crore or more; or
- net profit of Rs.5 crore or more

In line with the CSR Regulations, ReNew Saur Shakti Private Limited India Private Limited has developed their own CSR Policy in alignment with its CSR vision, principles and values, for delineating its responsibility as a socially and environmentally responsible corporate citizen. The Policy lays down the areas of intervention, principles and mechanisms for undertaking various programs in accordance with Section 135 of the Companies Act 2013.

ReNew Saur Shakti Private Ltd. (RSSPL) should take some initiatives for Community development Plan under their CSR Policy in the project affected villages viz. Korampally (200 Acres), Yelakurthy (120 Acres) and Salojipally (125 Acre). These may include:

- Employment opportunities to the people who are losing their lands in a manner that is affecting their livelihood resource in project area villages;
- Creating provisions for Employment opportunities to the people who are skilled and semi- skilled in project area villages;
- Supporting the Anganwadi Centres by facilitating them with provisions of exclusive Drinking Water and Toilet facilities for them in project area villages;
- Facilitating the Anganwadi Centres/ Local Schools by providing them with amenities like Chairs, Benches, running water facilities etc.;
- Facilitating in development and creation of Health Infrastructure in the Project Area villages, since there is no Health Facility at all.
- Promotion of education, including special education and employment enhancing vocation skills especially among children, women, elderly and the differently abled and livelihood enhancement projects;
- Promoting gender equality, empowering women, setting up homes and hostels for women and orphans, setting up old age homes, day care centers and such other facilities for senior citizens and measures for reducing inequalities faced by socially and economically backward groups etc.

Since ReNew Saur Shakti Private Limited has specific CSR Implementation Mechanism. Thus, under their CSR Policy, they should create provisions for the above mentioned matters and/ or any other pertinent issues. Recommendation under CSR Policy are given in **Table 4.30.**

Needs/Gap Assessment for CSR Initiatives

Analysis of above socio economics description and community consultation in project area villages reveals that concern of villagers are linked with the fulfilment of basic needs and improvement of some infrastructural facilities at school/ Anganwadi/ health etc. levels. On the basis of discussion with villagers, land sellers and Panchayat Members, following gaps have been identified which needs to be addressed:

Table 4-30: Key Needs/Gaps Identified and Recommendation for CSR Activity

Key Areas	Gaps identified	Recommendation for CSR
Education	• Lack of Higher Education facilities • Very low female literacy rate compared to male • Lack of vocational training in study area villages • Lack of computer literacy in study area villages especially in primary schools.	• Awareness program regarding female education at village level. This can be linked with vocational training programme of study area villages • Providing computer literacy program at village level
Drinking water	• Limited no. of bore wells and tanks are the main source of drinking water in the study area. • Ground water depth is around 60 ft. in all the project area villages observed during consultation	• Providing additional drinking water facilities project affected villages with help of concerned government dept. • Clean or purified drinking water is expected to significantly affect the quality of life and health for the villagers.
Health	• Absence of Health Care facility in study area villages I a affecting the basic health of the local people in a way. • Major diseases are observed – dental, joint pain and other general diseases are common.	• Organizing awareness camp on general health awareness. • Health camps or mobile health clinics can be provided.
Infrastructure and sanitation	• Though, village approach roads are good but access roads within the villages are both paved and unpaved in the study area villages • Either more than or closer to 50 % of the people in the study area villages are resort to open defecation • During the ESIA Team visit no scheme seen to be or heard about implemented in these villages under Swachh Bharat mission.	• Organizing awareness camp on sanitation and to be linked with sanitation program in the study area villages. • Low cost community toilets based on best practices to use less water can be worked out with the panchayats intervention.
Agriculture/ Irrigation	• Agriculture is dependent both on rain and irrigation. But the project affected	• Proper Link with irrigation program that can ease irrigation in the area

Key Areas	Gaps identified	Recommendation for CSR
	villages lacks adequate irrigation system. • Though minor irrigation system can be availed, but as informed by the villagers in most of the cases it can be made possible only after full discharge from the minor and major irrigation Schemes.	• Rain Water harvesting should be planned wherever possible with the project site to improve groundwater recharge. • Introduction of drip irrigation and similar schemes
Employment opportunities in the area	• Only a little number of SHGs (all under Development of women and children in Rural Areas or DWCRA –DCWRA) found to be present in the study are villages • Majority of the villagers are mostly unskilled • Labourers are mostly seasonal workers and migrate only for a short while in the nearby towns, either as Masons, or carpenter or as seasonal spin mill workers.	• Organizing training/capacity building program for SHGs regarding entrepreneurship and linkages with bank. • Introduction of processing of dairy and other produce related to livestock. •

Engagement of labour

Though the project is in pre-construction stage, considering factors involved in construction stage the below matters are given.

Indicators in Labour Engagement

- **Abolition of child and forced labour:** Engagement of child and forced labour by contractor or developer in any form for the proposed project will be unfair with the children' right.
- **Gender equity and non-discrimination:** Discrimination and imbalance in gender equity in employment and opportunity may lead to conflicts between contractor and labour.
- **Freedom of association and right to collective bargaining:** Not giving freedom to labour to express their views and form association may cause conflicts between labour and contractor but this is not applicable for solar plant as the labour requirement is of short duration restricted to construction phase only and number of labour employed is not very large for the same phase.

Photo 4-5: Documentation of Stakeholder's Consultation

Consultation with Land Aggregator & Land Sellers at Korampally Village

Consultation with representative of RSSPL at Korampally Village

Consultation with Teachers and other Staff Salojipally Primary School

Consultation with Ex- Sarpanch at Salojipally Village

Consultation with sub-registrar at his Office at Jogipet

Consultation with women at Korampally Village

Consultation with Land Sellers and Panchayat Members at Korampally

Consultation with Land Sellers and Panchayat Members at Yelakurthy

5 ANALYSIS OF ALTERNATIVES

The section gives analysis of alternatives with respect to the proposed project. The following scenarios have been considered:

- Current or No project Scenario
- Alternate methods of power generation;
- Alternate Location for the proposed project; and

5.1 Current or No project scenario

The State of Telangana, formed on June 2, 2014 is the youngest state in the country. Government of Telangana State (GoTS) recognizes the critical role which power sector plays in the socio-economic development of the state. Within a year of its formation, the State of Telangana has taken rapid strides in the power sector and GoTS has chalked out an action plan to make the State self-sufficient in power over the next few years. Due to the progressive policies implemented by GoTS, the state is expected to witness a high socio-economic growth trajectory. This would translate to higher requirement of power over the next few years. The state is fully geared up to meet the additional demand and has plans of adding over 6,000 MW of power from conventional sources over the next few years. Telangana discoms have been successfully harnessing the solar potential in the state and this will enable the state to have a more sustainable fuel mix in the years to come[61].

Total energy requirement in Telangana in FY 2014-15 was 50,916 MU. As against this only 48,788 MU was met leading to a deficit of nearly 4%. Energy requirement of Telangana is expected to nearly double from 50,916 MU in FY 2014-15 to 105,974 MU by FY 2018-19. The peak demand is also expected to increase three fold from 8,331 MW in FY 2014-15 to 19,053 MW in FY 2018-19[62]. Energy deficit in Telangana for last three years was in the range of 4%-12%. In FY 14-15, of which 2,128 MU could not be met resulting in an energy deficit with a maximum historic peak demand of 8,331 MW in 2014-15.
As can be seen from the table below, peak demand has increased by over 2,588 MW during the period FY 2008-09 till FY 2014-15 as against which peak met has increased by 1,345 MW.

Figure 5-1: Historical Power Supply Position of Telangana State in MU

[61] **G Jagadish Reddy,** Energy Minister, Telangana State
[62] *POWER FOR ALL Telangana State, Published 2015*

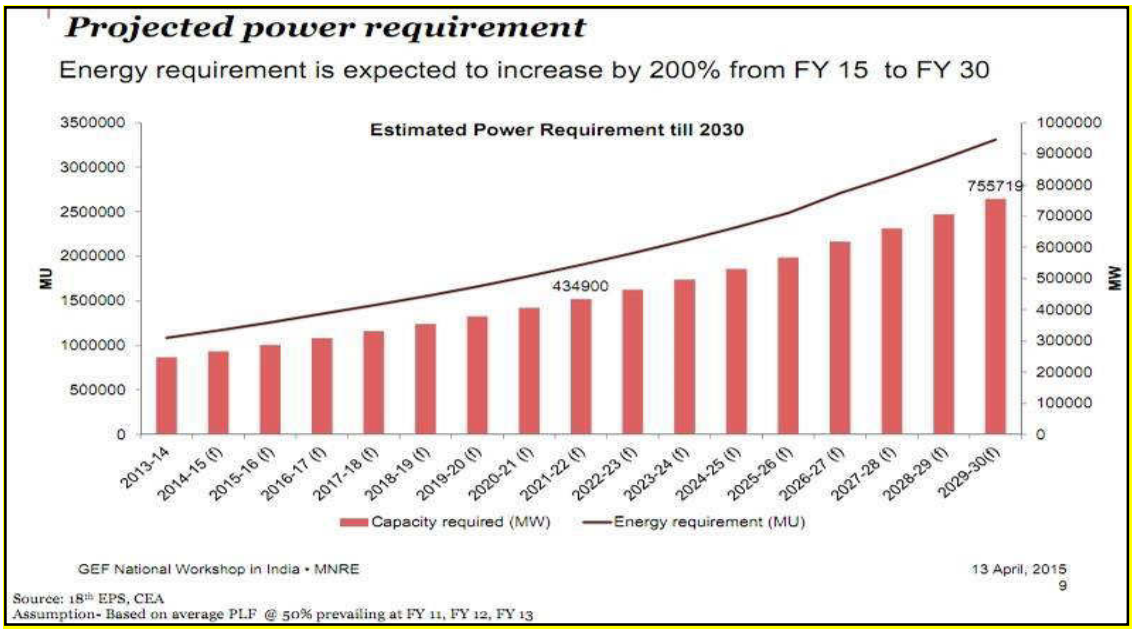
Table 5-1: Historical Power Supply Position in Telangana State

Period	Peak Demand (MW)	Peak Met (MW)	Peak Deficit/ Surplus (MW) (-/+)	Peak Deficit/ Surplus (%) (-/+)	Energy Requirement (MU)	Energy Availability (MU)	Energy Deficit/ Surplus (MU) (-/+)	Energy Deficit/ Surplus (%) (-/+)
2008-09	5,743	5,303	-440	-8%	31,883	30,348	-1,535	-4.8%
2009-10	6,253	5,855	600	10%	34,006	32,752	2,055	5.9%
2010-11	6,600	6,239	-361	-5%	36,490	35,602	-888	-1.9%
2011-12	6,866	6,461	405	6%	47,907	45,312	7,675	5.6%
2012-13	6,741	6,317	-424	-6%	48,758	42,942	-5,816	-11.9%
2013-14	7,076	7,177	699	9%	47,428	44,946	2,402	5.2%
2014-15	8,331	6,648	-1,683	-20%	50,916	48,788	-2,128	-4.2%

5.1.1 Energy Security:

In 2007 the Ministry of Environment Forests and Climate Change (MoEFCC), Ministry of Power (MoP) and the Bureau of Energy Efficiency (BEE) issued a paper entitled 'India: Addressing Energy Security and Climate Change'. In India the need for expanding the role of domestic Renewable Energy (RE) sources is a logical next step. Solar power is already in a position to provide a significant portion of India's planned capacity addition up to 2030, with simple regulatory and grid modernization initiatives. Unlike oil, coal or LNG, solar power is not subject to fluctuating fuel prices which drain India's limited foreign reserves, and in addition, solar power helps in reducing the carbon footprint of the economy. In the **Figure 5.2**, India's projected power requirement uptil 2030 has been indicated.

Figure 5-2: India's Projected Power Requirement



Source: Central Electricity Authority

While the total demand is expected to double in next 4 years 50916 MU to 105,974 MU by 2018-19 the peak demand is expected to increase from 8,331 MW to 19,053 MW.

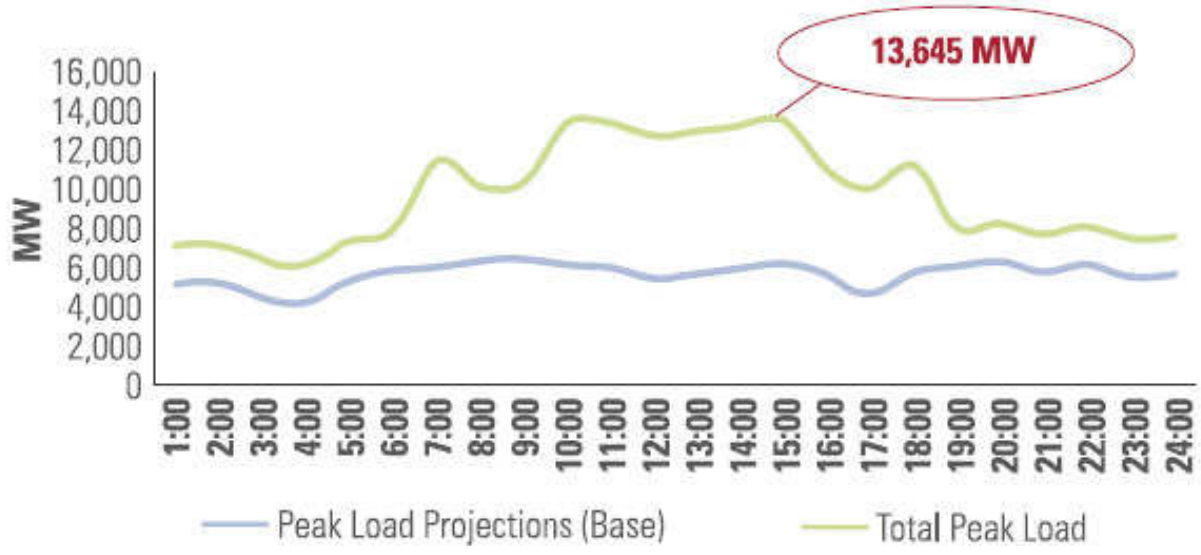
Table 5-2: Demand forecast for state of Telangana[63]

Parameters	FY 14-15	FY 15-16	FY 16-17	FY 17-18	FY 18-19
Base Sales (MU)	41,814	45,799	50,933	56,847	63,449
Additional Sales (MU)	-	2,975	9,348	19,502	24,761
Total Sales (MU)	**41,814**	**48,774**	**60,281**	**76,349**	**88,210**
Transmission Loss (%)	4.15%	4.10%	4.05%	4.00%	3.95%
AT&C Loss (%)#	12.61%	11.46%	10.95%	9.70%	9.01%
T&D Loss (%)	16.24%	15.09%	14.56%	13.31%	12.60%
Energy Requirement at grid level (MU)	49,920	57,441	70,554	88,071	100,928
Reserve Margin (MU)*	996	2,872	3,528	4,404	5,046
Energy Requirement (MU)	**50,916**	**60,313**	**74,081**	**92,475**	**105,974**
Peak Load (MW)[4]	**8,331**	**10,276**	**13,645**	**15,995**	**19,053**

Telangana has a vast solar potential with average solar insolation of nearly 5.5 kWh/m2 for more than 300 sunshine days. Government of Telangana (GoTS), intends to make use of the positive environment in solar market and the push given by GoI for substantially harnessing the solar potential in the state of Telangana. Towards this end, investor friendly solar policy has been announced.

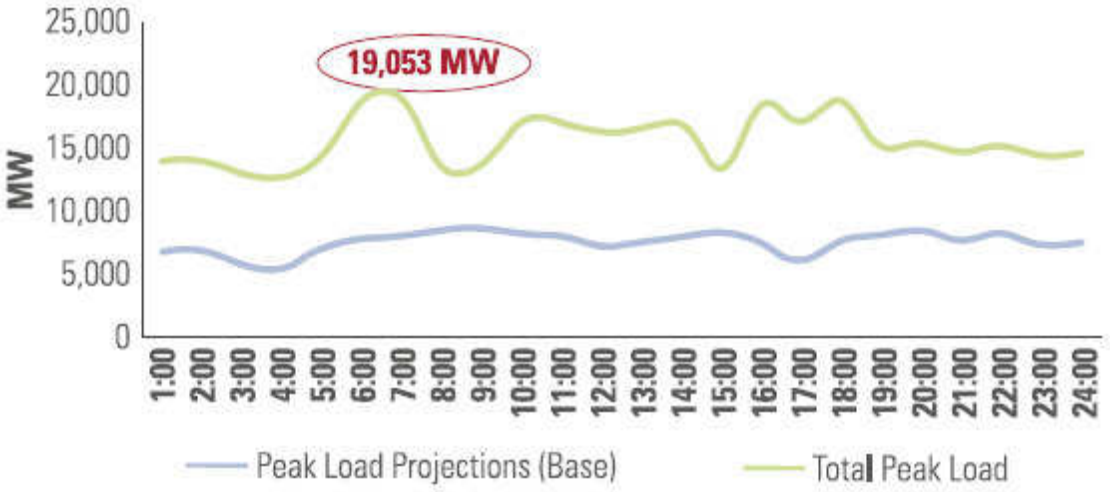
Entire Generation, Transmission and Distribution system needs to be equipped in order to be able to handle the peak demand which would be occurring during the day owing to multiple schemes planned by Telangana State. Out of the major schemes planned, Peak demand would majorly vary depending on 9 hours of agricultural supply and upcoming LI schemes for 16 hours a day. Current peak load demand pattern is expected to change as per figure below.

Figure 5-3: Peak load demand 2016-17



[63] *POWER FOR ALL Telangana State, Published 2015*

Figure 5-4: Peak load demand 2018-19



As seen in the figure above, demand is reaching its peak in day time, which can be attributed to the overlap of agricultural supply and LI schemes resulting in peak demand of 19,053 MW. Solar power can be used to supplement the peak load demand. Accordingly Telengana government has planned installation of 6,000 MW of solar power projects in the state as elaborated in Table below.

Table 5-3: Installed and proposed power generation capacity of Telangana.

All units in MW	Telangana Share – Installed Capacity		
	FY 2014-15	Upcoming	FY 2018-19
Thermal - TSGENCO	1,230	6,480	8,763
Thermal - APGENCO	1,514		
CGS	1,925	4,733	6,658
Hydro – TS/APGENCO	2,064	360	2,443
Gas	32		32
IPPS	1,350		807
Others	216	4,819	4,819
Solar	119	6,016	6,135
Wind	400		
NCE-Others	144		
Market Purchases	900		
Total	**9,894**	**22,408**	**29,657[5]**

5.2 Alternate Methods of Power Generation

There are various non-renewable and renewable energy sources which can be utilized for power generation. Each option has its own advantages and disadvantages. Based on the site conditions, availability of resources, environmental & social concerns and project cost suitable option for power generation need to be selected. Comparison of advantages and disadvantages of various non-renewable and renewable energy is represented in table given below.

Source of Energy	Advantages	Disadvantages
Coal	• Relatively cheap form of energy availability in large scale worldwide • Easily transported to power stations • GHG emission as low as 756 tonnes CO2e/GWh	• Non-renewable energy source • Large water requirement • High emission and generation of fly ash • When burned, coal releases lots of greenhouse gases • Mining of coal causes impacts on land and surrounding environment.
Oil & Gas	• Oil and natural gas are found in lots of places around the world. • Oil and gas can be easily transported by pipes or ships. • Natural gas is the “cleanest” of the fossil fuels • GHG emission as low as 547 and 362 tonnes CO2e/GWh for oil & gas	• Non-renewable energy source • Working environment risks to staff and environment • Burning oil and gas releases can cause pollution & health impacts
Nuclear	• Nuclear fuel does not create greenhouse gases when making energy. • Only a very small amount of nuclear fuel is needed to make a lot of energy. • Does not produce significant atmospheric pollutants. • GHG emission as low as 2 tonnes CO2e/GWh	• Expensive, especially in capital • costs, maintenance costs • The waste produced from nuclear energy is radioactive and Safe long-term disposal of nuclear waste can be difficult.
Solar	• Energy from the sun is exhaustive & free. • Solar energy does not create greenhouse gases. • GHG emission as low as 13 tonnes CO2e/GWh	• Solar power stations are expensive to build at the moment. • Only specified places are right for solar power. • Solar energy cannot be made at night
Wind	• Wind power does not create greenhouse gases. • The energy used to build one of the large turbines is repaid in 3-6 months. They last for 25 years. • GHG emission as low as 6 tonnes CO2e/GWh	• Need a lot of turbines to make electricity. • Wind turbines can only be used where it is windy. On days where there is little wind, less energy will be generated.
Hydroelectric	• Hydroelectricity creates no greenhouse gases. • Energy from water is free and will not run out. • Hydroelectric energy is more reliable than wind or solar power. • GHG emission as low as 2 tonnes	• Hydroelectric power needs enough water to turn the turbines. • Dams are expensive to build. • Building large dams can cause damage to water courses which affects people and wildlife and it can be difficult to find the right site.

Source of Energy	Advantages	Disadvantages
	• CO2e/GWh	• Small dams for local buildings on weirs do not have these problems.
Biomass	• Biomass fuel is cheap and could use rubbish that we might otherwise throw away. • Biomass fuels will not run out. • Biomass crops that are grown absorb the same amount of pollution whilst they are growing as they release when they are burned, so do not create extra greenhouse gases in the atmosphere. • GHG emission as low as 10 tonnes CO2e/GWh	• Growing biomass crops needs a lot of space and could replace growing valuable food crops. • Biomass fuels that are not grown (such as waste products) create greenhouse gases when burned.

The conventional sources of power generation have high environmental cost when compared to non-conventional sources like wind, solar, hydro, etc. its construction periods are longer with higher environmental risks from emissions. On the contrary power source from solar energy is most eco-friendly mode available. It does not have any kind of emissions during operation. While wind power requires high wind zones to be set up and micro siting along with detailed meteorological analysis is required, site selection for solar power is relatively easier. The power generation with Soar energy is a clean power with no emissions and feasible for the proposed project area keeping in mind the good solar potential of Telangana throughout the year. Considering this the state government has plans to increase its solar assed from 199 MW to 6016 MW.

5.3 Alternate Location for the Project

Solar energy projects are site specific and its feasibility depends on a number of factors which can be broadly categorized as solar resource assessment, land availability, cost of land and impact on community.

5.3.1 Identification of sites for solar plant

Global horizontal irradiance map of India is shown in **Figure 5.5**. The western and southern region of India has good solar potential with solar resource within the range of 5.5-6.0 kWh/m^2/Day. Telangana falling in the southern region also have good solar resource potential and can be harnessed.

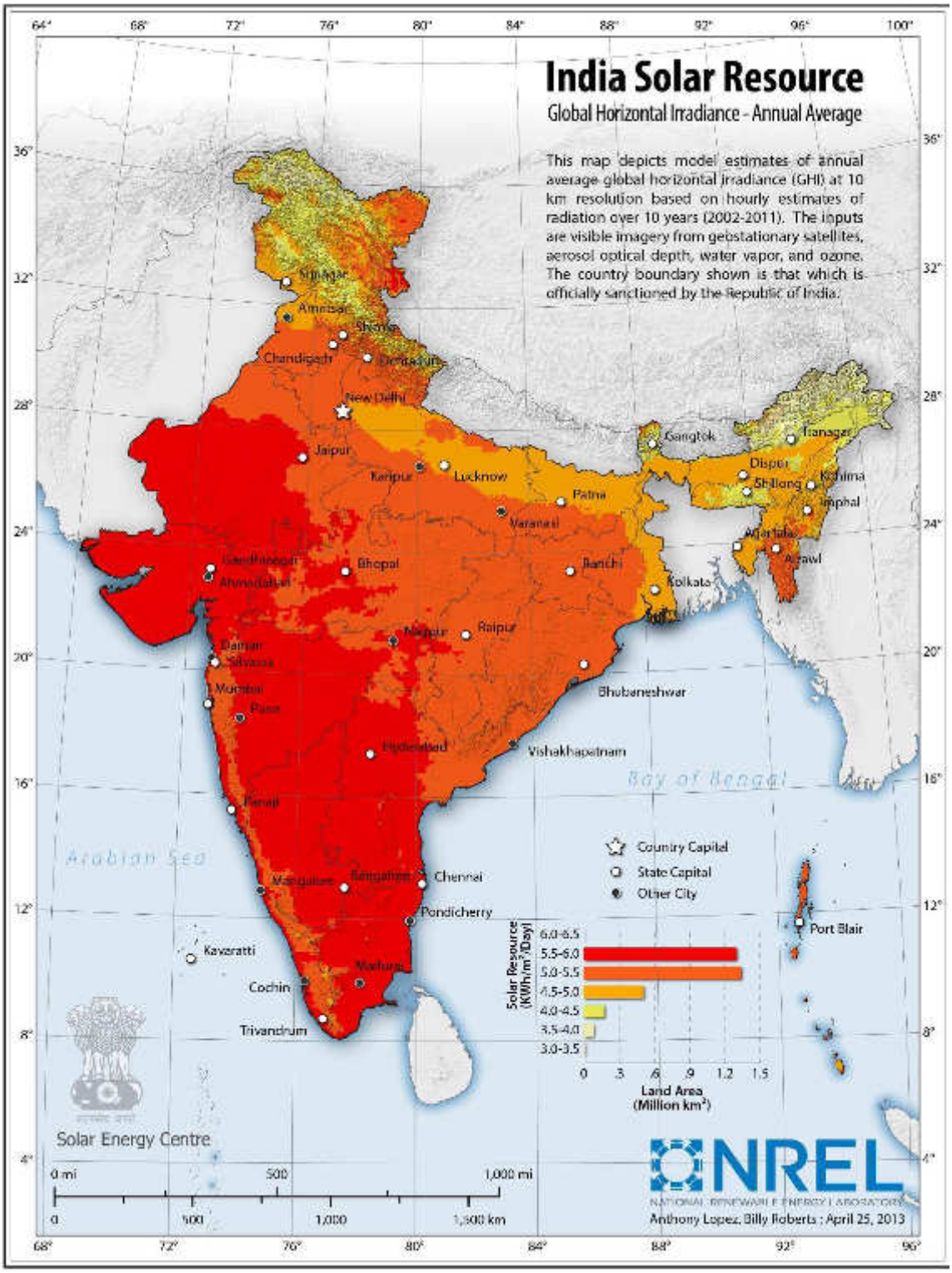
The key factors considered for the final selection of solar plant sites included the following:

- **Land Availability:** Land is readily available by willing seller, since the land is not very fertile. The project has been divided into two parts in consideration of land availability.
- **Solar radiation at the site:** Solar radiation map of India indicates that Telangana receives a global horizontal irradiation (GHI) in the range of 5.5 to 6 kWh/m^2/day. The first year energy yield prediction of the site data was estimated to be 105,646 MWh/annum.
- **Topography:** The project site is spread across an open area with very mild slope in multiple directions. Erection of solar panels is being undertaken through varying the height of the poles required for mounting solar panels. Hence, the installation is easy and reduces the cost of technical modifications required to adjust for undulations at the ground.
- **Substation proximity:** The proposed solar power plant will be connected to Minpur substation, located 10-12 km away from the project site.
- **Accessibility:** The site is connected to state highway through village road. Strengthening of village road will improve connectivity

- **Geological and soil conditions:** To ascertain soil parameters of the proposed site for construction of foundations for module mounting structures, control room, HT lines & array yard, drainage etc., the sub soil investigation through certified soil consultant has been carried out. Geological and soil investigations report confirm soil strength to support structures.
- **Near and far shading effects due to objects like transmission lines, trees, hills, wind farms etc.** There are no shading elements such as mountains or dense trees available on the site.

Any other alternative site would not enjoy above mentioned benefits

Figure 5-5: Solar Resource Potential Map



Source: http://www.nrel.gov/international/images/india_ghi_annual.jpg

5.3.2 Alternate routes for transmission lines

Laying of transmission line comprises of 220 KV single circuit line up to Minpur substation which will be around 10-12 km from the project site.

The route for the transmission line has been selected keeping in mind the following factors:

- Transmission line route is planned to avoid any habitations along the route;
- No house or community structures are located under the transmission line;
- Areas requiring extensive clearing of vegetation have been avoided;
- Selection of the transmission route avoids any environmental sensitive site like schools, health centers, etc.;
- Right of way/access roads will be shared with the common user of the substation.

The shortest possible route after considering the above factors will be selected for the transmission lines. Consideration of all the above factors will reduce the environmental and social footprint of the transmission line.

5.4 Conclusion

Various factors are considered such as solar resource potential at the project site, favourable environmental and social settings, lowest GHG emissions in the project life cycle, availability of land and other resources. Considering these factors it can be concluded that the proposed site is the best location for development of solar power project. There are about three more solar power projects of other developers that are in operation in the same district and few other in the process of construction or planning. This is due to availability and suitability of solar power potential, land availability and various supporting government policies.

6 ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT

6.1 Approach & Methodology

Primary impacts are assessed for a radius of 2 km around the project site and secondary impacts are assessed beyond this radius for the proposed project. Also, 100 m RoW along the tentative transmission line route is also considered for impact assessment. ADBS's safeguard policies[64] require that (i) impacts are identified and assessed early in the project cycle; (ii) plans to avoid, minimize, mitigate, or compensate for the potential adverse impacts are developed and implemented; and (iii) affected people are informed and consulted during project preparation and implementation. ADB emphasizes on the use of a screening process as early as possible, to determine the appropriate extent and type of environmental assessment so that appropriate studies are undertaken commensurate with the significance of potential impacts and risks.

The methodology adopted to assess the significance of impact associated with project activities during construction and operational has taken following criteria into consideration. Details of screening criteria are given in **Table 6-1**

Table 6-1: Screening Criteria for Environmental and Social Impact Assessment

Impact	Distribution of impact	Duration of Impact	Intensity
Low/ Short	Influence of impact within the project site boundary and RoW of Transmission line (Site)	Limited for duration of less than 6 months (Short)	Limited local scale impact resulting in temporary disturbance/ loss of environment/ social components (low)
Moderate/ Medium	Spread of impact within 2 km from the of the project site boundary (Buffer)	Impact may extends up to 2 years (Medium)	Local scale impact resulting in short term change and/ or damage to the environment components. (Moderate)
High/ Long	Influence of impact beyond 2 km from the project site boundary (Widespread)	Impact extends beyond 2 years (Long)	Regional impact resulting in long term changes and/ or damage to the environment components. (High)

6.1.1 Significance Evaluation Matrix

Significance evaluation matrix as shown in **Table 5-2** has been used to evaluate the significance of identified potential environmental impacts. This matrix includes criteria as discussed above to analyse the significance of impact. Colour codes have been given to signify the impact intensity.

Significance of environmental impact has been analysed and presented in further section of this chapter. The environmental impacts associated with the project activities have been identified and analysed to evaluate their significance. Because of clean category projects, environmental impacts are very few with minor significance and can be controlled through mitigation measures.

Table 6-2: Impact Significance Matrix

Distribution	Duration	Intensity	Significance
Within Site	Short	Low	LOW
Within Site	Short	Moderate	
Within Site	Medium	Low	

[64] *ADB's Safeguard policy Statement, June 2009*

Distribution	Duration	Intensity	Significance
Within Site	Medium	Moderate	
Within site	Long	Low	
Buffer area	Short	Low	
Widespread	Long	Low	
Within Site	Short	High	
Within Site	Medium	High	
Within Site	Long	Moderate	
Within Site	Long	Low	
Buffer area	Short	Moderate	
Buffer area	Medium	Low	
Buffer area	Medium	Moderate	MODERATE
Buffer area	Long	Low	
Buffer area	Long	Moderate	
Widespread	Short	Low	
Widespread	Short	Moderate	
Widespread	Medium	Low	
Widespread	Medium	Moderate	
Widespread	Long	Moderate	
Within Site	Long	High	
Buffer area	Short	High	
Buffer area	Long	High	
Widespread	Short	High	
Widespread	Medium	High	HIGH
Widespread	Long	Moderate	
Widespread	Short	Low	
Widespread	Short	High	
			NO IMPACT
			POSITIVE IMPACT

6.2 Impacts on Physical Environment

6.2.1 Air Quality

Construction Phase:

During construction phase, various project components such as transmission cable laying, switchgear, approach roads, internal road network and porta cabin construction will require land clearing, levelling, excavation, grading activities, vehicle movement and DG set operation. This results in an increased level of dust and particulate matter emissions, which in turn will directly and temporarily impact ambient air quality. If improperly managed, there is a risk of nuisance and health effects to construction workers onsite and to a lesser extent to nearby receptors from windblown dust (on the village access roads) due to transportation of raw materials. However, most of these project activities are expected to be restricted within the project boundary. Further, the movement of vehicles carrying raw materials on unpaved area

within the project site and on access road causes fugitive dust emission and may extend to surrounding of project site like nearest settlements. Hence, the distribution of impact can be considered medium, duration of impact is short an intensity of the impact as medium. Since the impact is widespread, but for short duration and of low intensity, the impact can be termed of a ***Moderate*** significance. But, the impact is reversible, and temporary in nature, if the following mitigation measures are adopted.

Mitigation Measures:

- Vehicles speed to be restricted to 20-30 km/hr on unpaved road.
- Raw material should be covered with tarpaulin sheet during transportation and in storage area
- Water sprinkling on unpaved area but ensure use of tanker water purchased form suitable authorised vendor only.
- All the project vehicles shall have valid Pollution under Control (PUC) certificate. Ensure regularly maintenance of project vehicles during construction and operational phase
- Turn off the machineries when not in use

Operational Phase:

During operational phase, there would be minimal vehicular movement about 2-3 project vehicles for commuting purpose. Since major source of emission into the ambient air will be absent during the operational phase therefore impact can be termed as insignificant.

6.2.2 Soil Quality

These impacts are associated with the project activities such as piling of module mounting structure and storage of diesel, spent oil or transformer oil.

Construction Phase:

The project has been proposed on open scrub and agricultural fallow land. Loose top soil is generated due to excavation on project site due to site levelling for erection of module structures towers and access roads. The impact anticipated here is loss of top soil because of inappropriate storage. However, these activities and associated impacts are limited to be within the project boundary and during construction phase only. Considering the activities limited within the site, short duration of construction phase and low intensity, significance of impact is evaluated as ***Low***. Soil contamination may result due to accidental spillage and inappropriate storage of diesel or used oil during construction phase. However, distribution of impact within the project boundary and short duration of construction phase with low intensity makes impact of ***Low*** significance and can be controlled with the recommended mitigation measures:

Mitigation Measures:

- Provide appropriate storage of top soil in an isolated and covered area to prevent its loss in high wind and runoff.
- Allow only covered transportation of top soil within the project site.
- Use top soil at the time of plantation and it can be given to nearby agricultural field after taking consent with the landowners/farmers.
- Plantation activities should be undertaken by Renew Power to appease the chances of soil erosion
- Store hazardous material like diesel and used oil in isolated room and on impervious surface to prevent seepage into project site soil
- Filling and transfer of oil to and from the container shall be on impervious surface

- Care should be taken with regard to possible changes in soil quality due to human activities, such as disposal of waste material and domestic effluents on soil of the surrounding area.

Operational Phase:

During operational phase, project activities such as excavation and usage of chemicals such as diesel and spent oil will be absent therefore impact associated with these activities such as top soil loss and soil contamination are not anticipated. Impact can be considered as insignificant.

6.2.3 Noise Quality

The environmental impact anticipated in the proposed project is the increment in ambient noise level due to various project activities.

Construction Phase

The major noise generating sources in the proposed project are operation of vehicular traffic, and construction equipment like dozer, scrapers, concrete mixers, generators, pumps, compressors, rock drills, pneumatic tools, and vibrators. The project site is located amongst barren fields with no continuous noise generating sources in the vicinity of the project site. But, the operation of these equipment's is expected to generate noise in a range of 75 – 90 dB (A). However, propagation of noise waves was assessed through the equation -1 and found that noise attenuates during propagation and lower down from 90 dB(A) to 47 dB(A) at 50 m distance from the source and the nearest settlement is about 900m from the project site. Also, intermittent operation in large area of project site reduces the intensity.

$L_p = L_w - 10 \log_{10} (2\pi R^2) - \alpha R$ -------- *(Equation -1)*

Lp = sound pressure level (dB) at a distance of R from a noise source radiating at a power level,

Lw= sound pressure level (dB) at source; R = distance of receptor from source;

α =frequency dependent sound absorption coefficient.

The above given equation can be used with either broadband sound power levels or a broadband estimate of the sound absorption coefficient (α = 0.005dB (A)/meter).

The construction activity will be mainly carried out during day time. Considering the short duration, distribution within site and low intensity, impact has been assessed as **Low** significance.

Mitigation measures

- Use DG set with acoustic enclosure
- Restrict major noise generating activities during night time 10:00 pm to 6:00 am
- Provide personal protective equipment to workers wherever noise is generated due to machinery operation.
- Regular maintenance of project vehicles

Operational Phase:

Any significant noise generating activity during operation of solar power plant is absent therefore impact in terms of increment in ambient noise level is not anticipated during the operational phase of the project.

6.2.4 Alteration of Natural Drainage Pattern

Topography of the project site can be characterized as mix (flat and mild undulations) therefore levelling or filling is expected to alter the natural drainage pattern.

Construction Phase:

During construction phase, site levelling activities will be carried out which in turn may result in change of contour level and natural drainage system. As a small natural drain exist in the project site at Salojipally therefore change in contour level may affect the flow of surface runoff from project site. After the levelling and paving, increment in surface runoff is expected which should be diverted to the natural drainage present in nearby area. If it is not done then surface runoff from the site may affect nearby agricultural field which may cause social agitation.

Considering the extent of impact outside of project boundary and high intensity, impact is considered as major significance and following mitigation measures are suggested to implement:

Mitigation Measures:

- Site levelling should be done with minimum alteration in contour level
- Design storm water drainage to discharge the surface runoff in the nearby natural drainage
- Do not disturb the natural drainage system
- The exit of runoff from the project site in the adjacent surrounding land area should be restricted
- Do not disturb the reservoir/pond located near the Salojipally and Korampally site

Operational Phase

In operational phase, project activities causing the alteration of natural drainage pattern will not exist, therefore associated impact is not anticipated.

6.2.5 Water Resources

Water is required for various project activities, fulfilment of this water requirement through ground water may have impact on water availability.

Construction Phase

In the construction phase, total water requirement for construction activities and labour camp is estimated about 19.5 -21.5 KLD. Further, construction activities will be limited only to 3-4 months duration therefore a long term water requirement is not expected. As CGWB study indicates that Tekmal mandal falls under safe zone therefore ground water table depletion is not anticipated due to construction activities.

Considering the limited distribution of impact (within the site), short duration of activities and low intensity, significance of impact is assessed as **Low**.

Operational Phase

Typically, ground water consumption during operation of solar power plant is high because of module cleaning requirement throughout the project life cycle. In operational phase, the water requirement would approximately be 1.6L/module[65]. The domestic water required is estimated to be 0.5 KLD, considering a total of 10-12 personnel onsite during operation phase including security personnel and technical staff on a 24 hours shift. Considering the distribution of impact in buffer area, long duration of activities and moderate intensity, significance of impact is assessed as **Moderate.**

65

https://www.ifc.org/wps/wcm/connect/f05d3e00498e0841bb6fbbe54d141794/IFC+Solar+Report_Web+_08+05.pdf?MOD=AJPERES

Mitigation Measures:

- Dry wiping method using microfiber cloth can be adopted to minimize water consumption for solar panel cleaning.
- Ensure optimal usage of water viz., storage and reuse of wash water after module washing and plantation of low water requirement species
- Construct rain water harvesting pit to recharge the ground water table

6.2.6 Solid/Hazardous Waste Disposal

Construction Phase:

Solid waste during the construction phase consists primarily of scrapped building materials, excess concrete and cement, excavated material, rejected components and materials, packing materials (pallets, crates, plastics etc.) and human waste. Reportedly, the broken solar panels will be properly packed and will be sent back to manufacturer. No agreement to support this was shared. However, taking in consideration the impact within site, short duration and moderate intensity, the impact is considered as ***Low.***

Mitigation Measures

- The excavated material generated will be reused for site filling and levelling operation to the maximum extent possible.
- Ensure broken solar panels are properly packed and sent back to manufacturer
- Food waste and recyclables viz. paper, plastic, glass, scrap metal waste etc. will be properly segregated and stored in designated waste bins/ containers and periodically sold to local recyclers while food waste will be disposed through waste handling agency.
- Waste oil will be collected and stored in paved and enclosed area and subsequently sold to authorized recyclers.

Operation phase:

There will not be any substantial generation of solid waste, other than insignificant domestic waste, and broken solar panels. The broken solar panels will be sent back to the manufacturer. Considering the limited distribution of impact (within the site), long duration of activities and low intensity, significance of impact is assessed as **low**.

Mitigation measures

- Food waste and recyclables viz. paper, plastic, glass, scrap metal waste etc. will be properly segregated and stored in designated waste bins/containers and periodically sold to local recyclers.
- Ensure broken solar panels are properly packed and sent back to manufacturer

6.2.7 Impact on Land and Landuse

Construction Phase

During construction phase, impact on landuse is anticipated due to various activities such as site levelling, filling and development of solar power plant. Landuse classification will change into industrial landuse after the development of solar power plant. Some impact on natural drainage system is also anticipated. Further, impact will be of long term and permanent in nature but impact will not be of adverse nature.

Mitigation measures

- Do minimum changes in contour level
- Do not disturb natural drainage system

Operation Phase

No impact on land use is envisaged during the operation phase.

6.2.8 Impact on Biological Environment

Construction phase

The associated ecological impacts of the construction phase are due to following activities:

- Clearing and levelling of land
- Fencing of land
- Laying of solar module foundation and erection
- Laying of transmission towers and transmission lines
- Creating access roads

The impacts envisaged on ecology during construction phase are enlisted below:

- Loss of vegetation and avian habitat due to site clearance, road construction, building and PV array support construction etc.
- Erosion and clearing of topsoil (loss of habitat and habitat fragmentation).
- Disturbance/ displacement of fauna, including avifauna associated with noise and movement of construction equipment and personnel.

Destruction and loss of vegetation

Project construction involves land clearance, levelling, etc. causing loss of vegetation (Like trees, shrubs, ground flora, etc.). The clearance of vegetation will be restricted to the project site. Clearing of vegetation is also required for access route and transmission lines. The proposed solar power plant site is located in three parcels (in villages namely Korampally, Yelakurthy & Salojipally) is located on barren or fallow agricultural land.

Clearance of trees and ground cover shall be done during the construction period. As it is a modified habitat, the conservation status of the project site and its immediate surroundings found to be poor. The ground cover occupied by grasses/ sedges and other shrubs/ herbs were mostly seasonal and the level of impact generated from removal of this seasonal understorey (ground cover) can be termed as negligible as the species are very common and have least conservation value. Many of them are weeds. At the same time, the construction period is also short and the understorey will once again grow up at same area after a good shower of rain once the construction is over.

The agricultural lands located around project site have trees like Neem, Acacia, etc. which may likely to be pruned/ cut from the project activities. Pruning of trees does not have any impact but the removal of tree species will have moderate level of impact. At Korampally, Yelkurthy and Salojipally site, around 98, 126 & 143 trees were counted respectively. Although no permission is required to cut the trees as per the tree felling and transit regulations in Telangana State[66], adequate amount of plantation shall be undertaken by the project proponent in the study area (along the avenues, schools, community lands) which not only replenish the loss of tree cover of the area but also enhance the green cover of the tree

[66] *http://forests.telangana.gov.in/Documents/EODB/ExemptedSpecies.pdf*

sparse region. It is also suggested that the trees must be transplanted and in cases where they cannot be transmigrated, new saplings must be planted.

Disturbance to Fauna

ADB's Environment Safeguards recognizes that protecting and conserving biodiversity is of utmost importance. The proposed solar power plant will result in habitat loss for resident species. Shy fauna are likely to avoid the area due to the human activity. There may also be a shift in small mammal and reptile community structure from the project area.

Transportation of construction equipment and construction activities is very likely to disturb faunal species of the area. Noise from construction and frequent movement of vehicles can also disturb the avifauna of the area. The project site does not fall in any of eco-sensitive areas such as national park, wildlife sanctuary area or forest area. This project will have a small foot print area and small mammalian species, birds and reptiles those were either sighted directly during primary survey or confirmed on their presence by the local seniors are very common and found all over the region. Temporarily, they may abandon the project activity area during the construction period and migrate to nearby areas. Thus the impact on fauna of the area is considered to be minor and for short duration.

Significance of Impact

The impacts of construction phase on ecology will be both direct in terms of vegetation and habitat loss/ displacement and indirect due to increased noise and heavy equipment and vehicular movement which will be limited to construction phase only. Overall the impact significance is assessed to be minor. The impact would be temporary and limited to only approach roads and construction area.

The impact on fauna and flora will have minor intensity with a local spread for a short duration which will result in an overall minor. However with proper implementation of suggested mitigation the impact may be reduced to negligible.

Mitigation Measures

The following measures should be considered in the project design to mitigate the impact during construction phase due to the project:

- All project activities shall be undertaken with appropriate noise mitigation measures to avoid disturbance to human as well as faunal population in the region.
- Activities generating high noise shall be restricted to day time and will be mitigated to minimize the noise level outside the site boundary.
- Recovery of ground storey (mostly grasses and herbs) vegetation under the PV panels and in other places that do not need to remain cleared shall be encouraged to grow.
- Movement of construction and transport vehicles shall be restricted to dedicated paths to minimize any harm to small mammals/ reptiles within the site.
- Transportation of construction material shall be restricted to day time hours in order to minimize noise and disturbance to fauna in the area.
- General awareness regarding wildlife shall be enhanced through putting signage, posters, among the staff and labourers.
- Strict prohibition shall be implemented on trapping, hunting or injuring wildlife present in and around the project site by the labour force and shall bring a penalty clause under contractual agreements.
- Camp and kitchen waste shall be collected in a manner that it does not attract wild animals.
- Temporary barriers shall be installed on excavated areas.

- The footprints of the construction activities shall be kept to minimum so as to reduce disturbance to flora and fauna.
- Planting adequate number of native, fast growing trees on access roads and/ or in nearby barren areas/ schools/ Panchayat office which may also give an alternate habitat to the faunal species especially the bird species and maintain the ecological balance.
- Care and maintenance of the planted species should be done for atleast three years to maximize the survival rate of the plants.

Impacts Due To Construction of Transmission Towers

The project activities during transmission tower construction, may involve clearing of trees along the route alignment wherever required, excavation for installation of towers, erection of towers, civil works related to transmission line and line stringing. Transmission towers of area 6mX6m will be erected for a route length of approximately 13.4 km. Thus the associated impacts would be low.

In this case, the removal of trees (If any) shall be fully compensated through plantation in and around the impacted area. The initial construction works along the alignment involving land clearance, cutting, filling, and levelling that may also cause loss of vegetation. None of the declared environmentally sensitive areas is located within the route alignment. It is not expected that any flora and fauna that are rare, endangered, endemic or threatened will be affected.

Small mammals and reptiles may be affected due to construction activities and this is purely temporary in nature. During the operation phase, most of the construction phase impacts will get stabilized and the impacts will be restricted only to the operation and maintenance of the project site.

6.2.9 Socioeconomic Impact

Socio-economic impact assessment is designed to assist communities in making decisions that promote long-term sustainability, including economic prosperity, a healthy community, and social wellbeing. To assess and understand the social impacts associated with the project, social indicators have been identified and analysed.

(A) Loss of land/ livelihood conflict

Construction Phase

Land in the project influenced area is predominantly used for agriculture and grazing. Grazing activities are limited to post-monsoon months when adequate vegetation is present. Irrigation facilities in not sufficient to meet the present need and demand. But Land at Yelakurthy and Salojipally (identified only till the time of study) are found to be uncultivated during the time of the ESIA Team visit. The procurement of land is almost completed at Korampally (200 Acres) and Yelakurthy (120 Acres) villages. Precisely, as information provided by the ReNew Saur Shakti Private Limited (RSSPL) about 445 Acres of private lands will be procured in total spread into three locations as mentioned earlier through willing to sale willing to buy basis. All the lands that has been procured was being done on willful sale agreement by the land owners for which adequate compensation (more than the land circle rate) in form of Sale amount.

Moreover, it was mentioned by the Land Owners at two of the project area villages, viz. Korampally (200 Acres) and Yelakurthy (120 Acres) that due to the escalating cost for cultivation and rising labour cost, profit from agriculture is gradually declining. They also wanted to have some more profit options which will support their immediate needs like children's higher education or marriage etc. Hence, farmers and land owners were looking for more ensured profiting and continuously supporting options.

The land owners have aspirations for betterment of their livelihood with the initiation of the proposed Projects.

Though formal Public Disclosure was yet to be made, it was confirmed by the land sellers, Panchayat Members and the community at large that the information about the proposed 65 MW Solar Power Project was communicated very clearly before the procurement of the land. It was also informed by the land sellers that they don't have any physical or financial loss due to selling of their lands.

It is concluded that land has been taken both at Korampally and Salojipally after paying the mutually agreed price (more than the land circle rate). Hence, considering all the above points neither physical nor economical displacement is envisaged. Further, taking the distribution of impact as within site for short duration and low intensity, the impact significance can be termed as Low**.**

Mitigation Measures:

- It should be ensured that proper public disclosure is undertaken for the project activities at the community level at each of the sites, viz. Korampally, Yelakurthy and Salojipally villages of Tekmal Mandal in Medak District.
- Proper compensation in form of sale amount should be paid properly as agreed and within stipulated time to the land owners to rule out conflict in future.
- Stakeholder engagement plan and Community development plan should be implemented for all the 5 Project Sites, viz. Korampally, Yelakurthy and Salojipally villages for the 65 MW Solar Power Plant in Tekmal Mandal of Medak district.
- It should be ensured that maximum employment is given to the locals w.r.t their capacity and skills.
- Grievance Redressal mechanism should be followed onsite. Complaints from the locals should be timely registered, investigated and resolved.

Operation Phase:

There would be no impact on land during operation phase. There would be requirement of security guards for Plant Sites, hence local employment opportunity would be generated and this would be a positive impact of the project as it would enhance the economic opportunities for the locals.

Mitigation Measures:

- Based on need assessment, CSR initiatives should be implemented in the project affected villages.
- ReNew Saur Shakti Private Limited should undertake a formal consultation with all landowners from whom right of way is to be obtained for construction of transmission towers and make them aware of the project details;
- ReNew Saur Shakti Private Limited should ensure that all agreements have been executed properly;
- Community development plan should be implemented.
- It should be ensured that maximum employment is given to the locals w.r.t their capacity and skills.
- Grievance Redressal mechanism should be followed onsite. Complaints from the locals should be timely registered, investigated and resolved.

(B) Engagement of Local and Migrant Labour

Construction Phase:

The social impact associated with the engagement of local and migrant labour in the proposed project is conflict between labour and contractor or developer which in turn may result in suspension of project and reputational risk on project developer. Considering the project in construction phase indicators have

been discussed to provide sense of what should not be done with respect to labour engagement. The issues discussed here in the form of indicators IFC PS 2 and Indian Labour Act. The distribution of impact is buffer area, duration is short and intensity is moderate, the impact significance can be termed as **"Moderate"**

Considering the sensitiveness associated with the engagement of child, forced labour, Renew has laid down policies through which it demonstrates compliance to all of the above factors. Its contractors should be made aware of all its policies for labour requirements and incorporated in their contracts prior to the starting of the project. Renew need to monitor the implementation of the policies on regular basis.

Mitigation Measures:

- Employment will be provided to local people wherever possible, especially as unskilled construction workers and security guards
- ReNew Saur Shakti Private Limited should include clause or provisions related with non-engagement of forced and child labour, gender equity, non-discrimination on employment and opportunity and freedom to express their view in contractors agreement and HR policy
- ReNew Saur Shakti Private Limited through its contractors should ensure that labour is being adequately paid by contractors. Also ensure that wages is being paid as per the requirement of minimum wages act
- ReNew Saur Shakti Private Limited will conduct internal audits as when required to monitor the performance of contractor.
- ReNew Saur Shakti Private Limited through the contractor will inform the labour about emergency preparedness plan and communication system to be followed during emergency situation
- ReNew Saur Shakti Private Limited through contractor should ensure that labour receive training on health and safety issues involved in the proposed project.

Operation Phase

Locals can be hired as security guards for all Project sites viz. at Korampally, Yelakurthy and Salojipally villages.

This will enhance the local employment and would be a **Positive Impact**.

(C) Labour Camp (Onsite / Offsite)

Construction Phase:

There are chances that some kind of conflict between the migrated labours and the labour community. Considering the possibilities of such conflicts and the existing situation the distribution of impact is buffer area, duration is short and intensity is moderate, the impact significance can be termed as **"Moderate"**

Mitigation Measures:

ReNew Saur Shakti Private Limited will setup onsite labour camp for labours employed through contractors to restrict the interaction of migrated labour with local community as to avoid any conflict.

(D) Social Issues Regarding Row and Such Matter

Construction Phase:

There are chances that some kind of social issues arise on Right of Way for transmission line etc. and thereby obstruction of places of importance at all of the Project Sites viz. Korampally, Yelakurthy and Salojipally villages in Medak district.Considering the existing condition and the records, information that has been received from ReNew Saur Shakti Private Limited the impact significance can be termed as **"Moderate".**

Mitigation Measures:

- The layout for access roads and transmission lines should consider minimum land requirement and should avoid procurement of agricultural land;
- The project management should undertake a formal consultation with all farmers from whom right of way should be obtained, gain informed consent
- Site Management should ensure that all agreements will be executed properly and documented
- Any waste generated during the construction phase should not be accumulated near the religious structure as this might affect the sentiment of the locals

(E) Community Engagement

Construction Phase:

There are chances that the local community's interest may impact with any sort of undue activities. Considering the future possibilities of such impacts the impact significance can be termed as "**Moderate**".

Mitigation Measure:

- During the Projects construction phase efforts will be made to engage with the community through the Panchayati Raj Institution representatives and key identified leaders of the community at each site viz. at Korampally, Yelakurthy and Salojipally in Tekmal Mandal of Medak district.

6.2.10 Health and Safety Impact

(A) Occupational Health & Safety Impact

Construction Phase:

Occupational Health and safety hazard associated with project activities (during construction) in Solar Power Plants are identified as follows:

- **Electrocution and Firing due to short-circuit**: It should be ensured that proper training be given to workers before they initiation of any project activity as well as the workers wear their appropriate Personal Protective Equipment (PPE) viz. helmets, safety jackets, safety shoes, goggles, gloves etc. as per their nature of work involved.
- Possible injuries associated with working with transmission line laying
- Accidents during cutting, chipping and piling
- ***Physical injuries:*** These can occur when workers involved in loading/unloading activities don't adhere to proper ergonomics discipline. Injuries like muscle strain, ligament tear, slip disc can occur which may prove to be fatal.
- ***Trip and fall hazards:*** The injuries are similar to those discussed under working at height. They occur when workers trip over/fall when debris etc. lies in the walkway/ passages.

- **Diseases due to unhygienic condition**: It should be ensured that proper and adequate number of toilets should be constructed for the labourers so that hygienic conditions prevail in the site area.
- **Violation of privacy and dignity of women involved**: There can be a violation of the privacy and dignity of the women involved in the work force as there is no enclosed or exclusive provision for women. ReNew Saur Shakti Private Limited following their Environmental and Social Management System (ESMS) and abide by the ADB Principles will ensure that the dignity and privacy of women is maintained through separate and protected provision for Sanitation Facilities during operation phase of these project as well as in other future projects of ReNew Saur Shakti Private Limited.

Also, there can be dissatisfaction among the labourers due to many conflicts/issues unresolved, hence there should be a complaint register onsite. ReNew Saur Shakti Private Limited's contractor should ensure to have regular medical check-up of their hired labourers. ReNew Saur Shakti Private Limited or their contractor should ensure to have regular medical check-up of their hired labourers. Hence, taking the distribution of impact as within site, duration as short and intensity as moderate, the impact significance can be taken as **Moderate.**

Mitigation Measures:

- All material will be arranged in a systematic manner with proper labelling and without protrusion or extension onto the access corridor.
- Loading and unloading operation of equipment should be done under the supervision of a trained professional
- All work at height to be undertaken during daytime with sufficient sunlight
- Proper PPEs should be provided to workers handling welding, electricity and related components. Workers handling electricity and related components shall be provided with shock resistant gloves, shoes and other protective gears.
- There should periodical training to educate the workers for proper use of PPE's.
- There should be proper monitoring system to ensure that each and every individual labourers are using the PPEs properly.
- Fire extinguishing equipment should be provided in adequate number on site to handle any possible fire outbreaks
- An accident reporting and monitoring record should be maintained
- Display of phone numbers of the city/local fire services, etc. at site should be done
- The labour engaged for working at height should be trained for temporary fall protection devices
- There should be arrangement for hygienic and scientific sanitation facilities for all the labourers working in the site.
- There need to have enclosed and exclusive provision for women to protect the privacy and dignity of the women involved in the work force.
- Provision of the Contract Labour Rules, 1971 require the operator of a construction site to provide adequate sanitation facilities to worker within the site premises (Latrine: One per 25 male/female; Urinal One per Male/female).
- Contractors should inform the labour about the Grievance Redressal Mechanism (GRM) by which they can inform about any grievances.
- Contractor should ensure that labour receive training on health and safety issues involved in the proposed project.
- Contractor should inform the labour about Emergency Preparedness Plan (EMP) and communication system to be followed during emergency situation.

Operation Phase:

Occupational Health and safety hazard associated with project activities (during operation) in Solar Power Plants are identified as follows:

- Electrocution/ Electrical Shocks: These may occur when the skin comes in contact with live power lines etc. The severity of the burn depends on voltage, current, time of contact etc.
- Firing due to short-circuit:

- Possible injuries associated with working at height
- Diseases due to unhygienic condition

The impact significance can be taken as **Moderate**.

Mitigation Measure:

- Provide and ensure wearing of personal protective equipment's viz., gloves, helmets, ear plug, safety belt etc.
- Ensure effective work permit system for critical activities such as electrical work and working at height
- Prepare emergency communication system and emergency preparedness plan
- Ensure proper sanitation facilities.

(B) LABOUR ACCOMMODATION (Onsite and offsite)

Construction Phase

As per International Labour Organisation "Housing provided to workers as part of the employment contract should meet certain minimum specifications in respect of the nature and standard of the accommodation and facilities to be made available. The guidelines and recommendation Facilities like drinking water, separate kitchen, fans, beds, toilets and power supply has been provided to the workers/labours in the labour camp set up in the project site." [67]

Considering the future construction RSSPL distinctly and exclusively consider and apply as far as possible the recommendations of ILO and other relevant Apex Bodies the following factors should be followed in all the three Solar Power Project sites viz. at Korampally, Yelakurthy and at Salojipally

- Housing space: Adequate housing space for labours has been provided. As per International Labour Organisation (ILO) standards, the floor area of workers' sleeping rooms should not be less than 7.5 square metres in rooms accommodating two persons, if a room accommodates more than four persons, the floor area should be at least 3.6 square metres per person.
- Adequate supply of safe potable water;
- Sanitation facilities for contract labourers: Proper functional toilets has been provided in the labour camp. The disposal of waste water is managed by the septic tanks and soak pits constructed in the camp.
- Proper and adequate drainage system to drain out the waste water to avoid any kind of contamination or spread of disease thereby;
- Adequate arrangements for comfortable and secure living within the sleeping room
- Arrangements for secured locker etc. for safe keeping of the labours' individual and personal belongings. which can be locked by the occupant to ensure privacy;
- Common Hygienic dining rooms, canteens or mess rooms, located away from the sleeping areas;
- There must have arrangements for safeguard of health issues and immediate arrangements for addressing accidental incidents.

Mitigation Measures:

[67] *Source: Labour Accommodation Standards, ILO*

- ReNew Saur Shakti Private Limited has formulated their own Environmental Social Management System (ESMS). Following that an Emergency Preparedness Plan to deal with health and safety issues during project life cycle of a Solar Power Plant will be built.
- RSSPL will ensure that they will abide by the policy of safe guarding all issues regarding the health and safety of the workers who are working under the Projects.
- **Emergency Preparedness and Plan for On-Site Emergencies:** the plan has defined nature of emergencies that can be encountered during operation of a solar. Requirements of an Emergency Control Centre (ECC), firefighting facilities and medical facilities has also been detailed out. Roles and Responsibilities of personnel at site, communication channel to be followed, and procedures for different emergencies have also been detailed. ReNew Saur Shakti Private Limited should ensure that all its hired contractors should abide by the requirements of plan formulated like undertaking mock drills, identification of first aiders and fire fighters, display of emergency numbers onsite etc.

(C) Community Health & Safety

Construction phase:

During construction phase, various project components such as transmission cable laying, switchgear, approach roads, internal road network and porta cabin construction require land clearing, levelling, excavation, grading activities, vehicle movement, DG set operation will take place. This will results in an increased level of dust and particulate matter emissions, as well as high traffic load, which in turn will directly and temporarily impact the local community. If improperly managed, there is a risk of nuisance and health effects. Taking the distribution of impact as within site, duration as short and intensity as low, the impact can be considered as "**Low"**

Mitigation Measures

- Identify route for movement of project vehicles which, should not include narrow village road and road passing through cluster of settlements
- Depute traffic escorts as and when required near project site and major settlements to guide movement of project vehicles
- Keep limited speed of project vehicles near settlements and within the project site.
- Provide necessary training to the drivers for speed restrictions and on do's and don'ts
  - During construction phase
  - Operational Phase

Operation Phase:

Traffic Movement: In operational phase very few (2-3 nos.) of vehicles will be required for commuting from home to site office. Therefore, impact associated with movement of project vehicles is not anticipated. Besides, there may be impact due to restriction in public access, but considering (as informed during interaction) ReNew Saur Shakti Private Limited will construct strengthen existing roads within the village connecting the main roads and between places with different Project sites.

Risk of Electrocution: Risk of Electrocution is anticipated in the operational phase of the project, which could be mitigated through boundary wall and restricted entry in project site.

Taking all these points in consideration, with distribution buffer area, duration short and intensity low, the significance of impact can be taken as **Low**.

Mitigation Measures

- Ensuring effective work permit system for critical activities such as electrical work

- Boundary Wall and restricted entry in project site
- Prepare emergency communication system and emergency preparedness plan should be framed.

(D) Impact on Cultural/ Archaeological Site

The site does not contain any archaeological monuments or sites as per the Archaeological Survey of India. No historical and cultural monuments will be affected by the projects viz at Korampally, Yelakurthy and at Salojipally village of Tekmal Mandal in Bhatinda district.

One fort like Structure is found to be located on Sangareddy- Medak Road at Andole village under Andole Mandal of Medak District about 16.23 Km. south from the Project Area. There is one Tower like structure is also found adjacent to the fort like structure, According to the villagers that it was used as Watch Tower in the time of yore. One Temple is found located within the mentioned fort. A local deity namely Sri Ranganatha is worshipped till date within the Temple. It was informed by the local people that the structure was said to be built by local chieftain ***Queen Shankaramma*** approximately on 1712 AD.

So far it was informed that there is no designated or non- designated heritage site in the study area villages of the project area though no such evidential proof was found in the site area villages viz at Korampally, Yelakurthy and Salojipally villages at Tekmal Mandal of Medak District. Though, to ensure whether alike remnants of old civilization similar to the Fort are possible to be unearthed within the close proximity of the Project Area and in case of accidental discovery of artefacts during construction activities, chance find procedure is required to be planned and implemented.

No impact is envisaged both during construction and operation phase.

(E) Access to Common Property Resources

Another issue which may cause social impact on indigenous people in terms of conflict between project developer and local community is restriction on community to access the common property resources. Any physical structure with historical, religious and aesthetic significance was also not found close to any of the three project sites, viz at Korampally, Yelakurthy and Salojipally. Considering the absence of resources with cultural significance, disturbance to physical cultural resources and impact associated with it is not anticipated for both the construction and operation phase.

Regarding RoW of the Korampally (200 Acres), there will not be any issue, because the site area is located on *Chinthakunta- Kottapally Road*. The two other different sites viz at Yelakurthy and Salojipally are located a little away from the main road and at the village Interior Road. As informed by the Project proponent, the access roads will be strengthened and further maintained till the project cycle within the villages.

No impact is envisaged both during construction and operation phase.

(F) Corporate Social Responsibility

Construction Phase

To empower the local community through different development and support programmes ReNew Saur Shakti Private Limited should take some initiatives for Community development Plan under their CSR Policy in the project affected villages viz. Korampally, Yelakurthy and Salojipally villages in Tekmal Mandal of Medak District.

ReNew Saur Shakti Private Limited India Private Limited has developed their own CSR Policy in alignment with its CSR vision, principles and values, for delineating its responsibility as a socially and environmentally responsible corporate citizen. The Policy lays down the areas of intervention, principles and mechanisms for undertaking various programs in accordance with Section 135 of the Companies Act 2013.

The CSR Activities may include:

- Employment opportunities to the people who are losing their lands in a manner that is affecting their livelihood resource in project area villages;
- Creating provisions for Employment opportunities to the people who are skilled and semi- skilled in project area villages;
- Supporting the Anganwadi Centres by facilitating them with provisions of exclusive Drinking Water and Toilet facilities for them in project area villages;
- Facilitating the Anganwadi Centres/ Local Schools by providing them with amenities like Chairs, Benches etc.;
- Facilitating in development and creation of Health Infrastructure in the Project Area villages, where it is found to be inadequate;
- Promotion of education, including special education and employment enhancing vocation skills especially among children, women, elderly and the differently abled and livelihood enhancement projects;
- Promoting gender equality, empowering women, setting up homes and hostels for women and orphans, setting up old age homes, day care centers and such other facilities for senior citizens and measures for reducing inequalities faced by socially and economically backward groups etc.

Since ReNew Saur Shakti Private Limited has specific Implementation Mechanism under their CSR Policy, they should create provisions for the above mentioned matters and any other pertinent issues.

Operation Phase

The CSR activity may continue during Operation Phase to comply with the need and requirement of the areas development and to avoid any conflict during that phase.

6.2.11 Cumulative Impacts

There are three other renewable energy projects located near the proposed project site. All three of them are solar power projects located near the project site. 150 MW solar power plant developed by Sky Power is located near the Yelakurthy site. Both the other solar power plant each of 10 MW are developed by MV solar.

Considering the availability of land and good solar potential in the district, establishment of some other solar power project in near future cannot be ruled out. As the proposed solar power project do not involve forceful acquisition of land and the settlements are located at a distance from the plant, as such no resettlement issues are there. Also, no obstruction to common property resources are anticipated. Hence, no cumulative impact is envisaged due to the proposed project.

7 ENVIRONMENTAL & SOCIAL MANAGEMENT PLAN

The Environment and Social management Plan specifies measures for addressing the limited negative risks and impacts and for enhancing the beneficial impacts. In addition, organizational capacity and training requirements, required to check and ensure effectiveness of the plan throughout the lifecycle of the project, have also been discussed.

Renew Power is committed to implement an effective Environmental and Social Management System (hereinafter referred as ESMS) to continuously manage and communicate the potential social and environmental impacts and risks imposed on the project employees (direct and indirect) and the local communities residing in the immediate vicinity of the project area. The outcomes of the Environmental and Social Impact Assessment of the proposed project have been used to formulate an Environment and Social management & Monitoring Plan for the project, presented in **Table 6.1**. The Plan specifies measures for addressing the limited negative risks and impacts and for enhancing the beneficial impacts. In addition, organizational capacity and training requirements, required to check and ensure effectiveness of the plan throughout the lifecycle of the project, have also been discussed.

7.1 Training of Personnel & Contractors

RSSPL should ensure that the job specific training and EHS Induction training needs are identified based on the specific requirements of ESMS and existing capacity of site and project personnel (including the contractors and sub-contractors). Special emphasis shall be placed on traffic management, stakeholder's engagement and grievance redressal. General environmental awareness shall be increased among the project's team to encourage the implementation of environmentally sound practices and compliance requirements of the project activities. This will help in minimizing adverse environmental impacts, ensuring compliance with the applicable regulations and standards, and achieving performance beyond compliance. The same level of awareness and commitment shall be imparted to the contractors and sub- contractors prior to the commencement of the project.

An environment and social management training programme shall be conducted to ensure effective implementation of the management and control measures during construction and operation of the project. The training programme shall ensure that all concerned members of the team understand the following aspects:

- Purpose of action plan for the project activities;
- Requirements of the specific Action Plans
- Understanding of the sensitive environmental and social features within and surrounding the project areas; and
- Aware of the potential risks from the project activities.
- A basic occupational training program and specialty courses shall be provided, as needed, to ensure that workers are oriented to the specific hazards of individual work assignments.
- Training shall be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards.
- Workers with rescue and first-aid duties must receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers.
- Through appropriate contract specifications and monitoring, the employer shall ensure that service providers, as well as contracted and subcontracted labour, are trained adequately before assignments begin.

7.2 Monitoring

In order to implement the ESMP, the on-site team should adhere to a time-bound and action-oriented Environmental and Social Action Plan to implement the mitigation measures provided for each of the identified environmental and social impacts. This ESMP should be monitored on a regular basis, quarterly or half-yearly and all outcomes would need to be audited in accordance with existing EHS commitments.

The monitoring process should cover all stakeholders including contractors, labourers, suppliers and the local community impacted by the project activities and associated facilities thereby increasing the effectiveness of suggested mitigations measures. RENEW POWER should ensure that all the contractors comply with the requirements of conditions for all applicable permits, suggested action plans and scheduled monitoring. The inspections and audits should be carried out by an internal trained team and external agencies/experts. The entire process of inspections and audits shall be documented and key findings of which should be implemented by the proponent and contractors in their respective areas.

7.3 Documentation & Record Keeping

Documentation and record keeping system has to be established to ensure updating and recording of requirements specified in ESMP. Responsibilities have to be assigned to relevant personnel for ensuring that the ESMP documentation system is maintained and that document control is ensured. The following records should be maintained at site:

- Documented Environment Management System;
- Legal Register;
- Operation control procedures;
- Work instructions;
- Incident reports;
- Emergency preparedness and response procedures;
- Training records;
- Monitoring reports;
- Auditing reports; and
- Complaints register and issues attended/ closed

Table 7-1: Environment Management Pan

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
CONSTRUCTION PHASE							
A	**Physical Environmental Management Plan**						
1	**LANDSCAPE AND VISUAL**	Visual and landscape impacts due to presence of elements typical of a construction site such as equipment and machinery.	**LOW**	• Ensure the construction site is left in an orderly state at the end of each work day • Construction machinery, equipment, and vehicles not in use should be removed in a timely manner to the extent possible • Proper handling of waste streams	**NO IMPACT**		Contractor under the supervision of RSSPL's Personnel
2	**GROUND WATER ABSTRAC-TION**	The total water requirement is high. However, the region as per CGWB falls under safe zone but extraction of ground water over a long period may cause a serious concern. Hence the impact is envisaged.	**MODERATE**	• During construction phase, water is being sourced from bore wells for which permission needs to be taken from CGWB. • Construct rain water harvesting pit to recharge the ground water • Use dry wipe method to clean the modules • Reduce the frequency of washing to save water • If possible, collect the water after module wash and reuse it for module washing	**LOW**	Maximum efforts should be made to reuse and recycle water to reduce water consumption.	Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
3	**GROUND WATER QUALITY**	• Possibility of contaminated runoff from the site entering the nearby water bodies. • Domestic water runoff from the portable toilets into neighbouring water bodies can lead to degradation of water quality. • Waste water from toilets constructed for site office can contaminate groundwater.	**LOW**	• Storage of oil shall be undertaken on paved impervious surface and secondary containment shall be provided for fuel storage tanks • Adequate drainage of road based on road width, surface material, compaction and maintenance • Leak-proof holding tanks for sanitary waste water should be constructed to protect the shallow ground water level. • Waste water holding tanks / septic tank should be located at more than 500 m away from bore wells or any other underground water holding tanks. • It should be ensured that the waste water does not find its way into surface waters or water wells.	**LOW**	• Machinery and vehicles shall be thoroughly checked for the presence of leaks if any; • Leakage of vehicles to be checked; • Storage of oil on site to be checked	
4	**AIR QUALITY**	• Fugitive Dust due to movement of project vehicles and site clearance • Emission from Diesel Generators	**MODERATE**	• Vehicles speed to be restricted to 20-30 km/hr. on unpaved road. This will reduce dust emission • Raw material should be covered with tarpaulin sheet during transportation and in storage area • Practices water sprinkling wherever required on unpaved area but ensure use of tanker water purchased form authorized vendor only	**LOW**		Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				• All the project vehicles shall have valid PUC certificate • Ensure regular maintenance of project vehicles during construction and operational phase • Turn off the DG sets & machineries which are not in use • DG sets preferably should be placed away from settlement area. • It will be ensured that exhaust emissions of construction equipment adhere to emission norms as set out by MoEFCC/ CPCB.			
5	**SOIL QUALITY**	Top Soil Loss	**LOW**	• Provide appropriate storage of top soil in an isolated and covered area to prevent its loss in high wind and runoff. • Allow only covered transportation of top soil within project site. • Use top soil at the time of plantation on the approach road. • Construction debris shall be reused in paving on site approach road to prevent dust generation due to vehicular movement • Re-vegetation shall be done in the area after the completion of construction, in order to reduce the risk of soil erosion	**NO IMPACT**	• The workforce shall be sensitized to handling and storage of hazardous substances viz. fuel oil, machine oil/fluid etc. • The workers engaged in handling hazardous substances shall be briefed about the possible	Project Developer/ Contractor under the supervision of Renew Power's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				hazards and the need to prevent contamination.			
		Soil Contamination		• In case of any accidental spill, the soil will be cut and stored securely for disposal with hazardous waste. • Store hazardous material (like used oil) in isolated room with impervious surface. • Filling and transfer of oil to and from the container shall be on impervious surface. • Waste disposal grounds that are in use by the local people should be identified and permission from local administration for use of the same needs to be obtained for disposing domestic wastes.			
6	**NOISE LEVEL**	• Disturbance to habitants • Vehicular noise from heavy vehicles utilized to deliver construction materials and solar plant parts • Noise from DG sets • Construction noise from using mobile equipment,	**LOW**	• Regular maintenance of construction machinery and equipment shall be carried out to ensure noise emissions are maintained at design levels. • Integral noise shielding to be used where practicable and fixed noise sources to be acoustically treated, for example with silencers, acoustic louvers and enclosures. • Keep stationary source of noise such as DG sets (during construction phase) at farthest point from the settlements • Restrict major noise generating activities during night time 10:00 pm to 6:00 am	**NO IMPACT**	It will be ensured that noise emissions of construction equipment adhere to emission norms as set out by MoEFCC/ CPCB	Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
		and concrete mixing		• Provide personal protective equipment to workers working near DG sets and other high noise source. • Local communities need to be informed about the vehicular movement before start of heavy vehicle carrying materials and machines to site. Sensitive locations should be identified and avoided as far as possible from the route and if unavoidable, drivers should be informed to restrict speed at those locations. • Diesel generator sets, if used; will adhere to noise standards of MoEFCC.			
7	**SOLID WASTE**	Contamination of land	**LOW**	• Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste". • Domestic and construction waste like recyclables viz. paper, plastic, glass, scrap metal waste etc. will be properly segregated and stored in designated waste bins/containers and periodically sold to local recyclers	**NO IMPACT**	Periodic EHS audits should be conducted to monitor the same	Project Developer/ Contractor under the supervision of RSSPL's Personnel
8	**CHANGE IN LOCAL TOPOGRAPHY**	Alteration in natural drainage pattern	High	• Don't allow the considerable alteration of contour level • Provide alternatives to collect surface runoff from the project site during the monsoon period	**Low IMPACT**	The drainage patterns of the area will be maintained.	Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				• Don't allow exit of runoff from the project site in the adjacent areas. • Design storm water drain considering the natural contour level • Site preparation activities should be designed to avoid any significant elevation of the land or blocking or altering natural drainage channels in the project site. • Site preparation and development shall be planned only after a detailed drainage plan has been prepared for site. • If channels/drains get blocked due to negligence, it will be ensure that they are cleaned especially during monsoon season.			
B	**Biological Environmental Management Plan**						
9	**ECOLOGY**	• The construction activities will lead to loss of vegetation resulting in displacement of terrestrial species • Disturbance to local livestock population	**LOW**	• All project activities shall be undertaken with appropriate noise mitigation measures to avoid disturbance to human as well as faunal population in the region. • Activities generating high noise shall be restricted to day time and will be mitigated to minimize the noise level outside the site boundary. • Recovery of ground storey (mostly grasses and herbs) vegetation under the PV panels and in other places	**NO IMPACT**	Periodic EHS audits should be conducted to monitor the same	Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				that do not need to remain cleared shall be encouraged to grow. • Movement of construction and transport vehicles shall be restricted to dedicated paths to minimize any harm to small mammals/reptiles within the site. • Transportation of construction material shall be restricted to day time hours in order to minimize noise and disturbance to fauna in the area. • General awareness regarding wildlife shall be enhanced through putting signage, posters, among the staff and labourers. • Camp and kitchen waste shall be collected in a manner that it does not attract wild animals. • Temporary barriers shall be installed on excavated areas. • The footprints of the construction activities shall be kept to minimum so as to reduce disturbance to flora and fauna. • Planting native, fast growing trees on access roads and/or in nearby barren areas/ schools/ Panchayat office which may also give an alternate habitat to the faunal species especially the bird species and maintain the ecological balance.			

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				• Care and maintenance of the planted species should be done for atleast three years to maximize the survival rate of the plants.			
B	**Social Management Plan**						
1	**Hiring of Labour**	Creating Job Opportunities and Risk of labour dissatisfaction due to: • Lack of basic amenities and facilities • Engagement of forced and child labour • Discrimination towards female labour • Inadequately paid labour	**MODERATE**	• RSSPL should include clause Renew Power to ensure access of necessary basic amenities and facilities such as drinking water, kitchen, toilet and crèches (for children) • RSSPL team to ensure no engagement of child labour and forced labour in any task related with the project • Renew Power to ensure access of equal opportunity and benefit for the female worker • Renew Power to ensure all the workers get compensation as mentioned in Minimum Wages Act	**LOW**	Periodic EHS audits should be conducted to monitor the vendor practices	Project Developer/ Contractor under the supervision of RSSPL's Personnel
2	**Land Procurement**	Loss of Land/Livelihood	– MODERATE	• RSSPl land team to monitor the compensation details paid by land aggregator to all the land owners • The project management shall undertake a formal consultation with all Farmers from whom land shall be obtained, gain an informed consent	**LOW**	RSSPL Land and Project Team to understand mitigation measures	RSSPL Team and Vendor

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
				• Implement the recommended complaint resolution procedure (Grievance Redress Mechanism) to assure that any complaints regarding project related components are promptly and adequately investigated and resolved • Provide some alternate way/road so that project should not obstruct the villagers access			
3	**Impact on Indigenous people and archeologically important sites**	Unrest among the community due to dislocation of any structure or thing of cultural belief Impact on indigenous people due to land intake from ST people and use of village resources	**No Impact**	• No Impact	**No Impact**	-	-
3	**COMMUNITY HEALTH AND SAFETY IMPACT**	• Conflicts between labour and local community	**MODERATE**	• RSSPL to supervise the accommodation provided to migrant labours (semi-skilled) through contractors. • RSSPL to ensure & restrict the interaction of migrated labour with local community as to avoid any conflict.	**LOW**	• Grievance Redressal mechanism should be followed and monitored	Project Developer/ Contractor under the supervision of RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
4	**OCCUPATIONAL HEALTH AND SAFETY**	• Material handling and storage • Possible injuries associated with working with transmission line laying • Other occupational hazards	**MODERATE**	• All material will be arranged in a systematic manner with proper labelling and without protrusion or extension onto the access corridor. • Loading and unloading operation of equipment shall be done under the supervision of a trained professional • Proper PPEs shall be provided to workers handling welding, electricity and related components. • Fire extinguishing equipment shall be provided in adequate number on site to handle any possible fire outbreaks • An accident reporting and monitoring record should be maintained • Display of phone numbers of the city /local fire services, etc. at site should be done • The labour engaged for working onsite shall be trained for erecting solar modules.	**LOW**	• All the workers shall be made aware of the possible occupational risks/hazards by the way of an OHS training/awareness programme • An accident reporting and monitoring record should be maintained	Project Developer/ Contractor under the supervision of RSSPL's Personnel
OPERATION PHASE							
	A. PHYSICAL ENVIRONMENT MANGEMENT PLAN						
1	**HAZARDOUS WASTE MANAGEMENT**	Contamination of land and soil	**MODERATE**	• Broken solar panels, which will be collected in closed containers and then will be sent back to manufacturer	**LOW**	Periodic EHS audits should be conducted to monitor the same	Project Developer/ RSSPL's Personnel

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
2	**SOLID WASTE MANAGEMENT**	Contamination of land	**MODERATE**	• Distribute appropriate number of properly contained litter bins and containers properly marked as "Municipal Waste". The waste generated should be disposed as per The Municipal Solid Wastes (Management and Handling) Rules, 2000. • Domestic waste will be composted and recyclables viz. paper, plastic, glass, scrap metal waste etc. will be properly segregated and stored in designated waste bins/containers and periodically sold to local recyclers.	**LOW**	Periodic EHS audits should be conducted to monitor the same	Project Developer / RSSPL's Personnel
3	**GROUNDWATER ABSTRACTION**	Ground water depletion if extracted during operation phase (permission has to be obtained from statutory authority)	**MODERATE**	• Ensure optimal usage of water viz., storage and reuse of wash water after module washing. • Rain water harvesting to be practised.	**LOW**	Periodic EHS audits should be conducted to monitor the same	Project Developer / RSSPL's Personnel
4	**WASTEWATER MANAGEMENT PLAN**	Degradation of ground and surface water quality	**MODERATE**	• Ensure that constructed septic tanks during operation are well contained and impermeable to prevent leakage of wastewater into soil. • Ensure that septic tanks are emptied and collected by contractor at appropriate intervals to avoid overflowing	**LOW**	Periodic EHS audits should be conducted to monitor the same	Project Developer / RSSPL's Personnel
B	**SOCIAL MANAGEMENT PLAN**						

SN	Aspect	Impact	Impact Intensity without mitigation	Action	Impact Intensity with mitigation	Monitoring/training Requirement	Responsibility
1	**CORPORATE SOCIAL RESPONSIBILITY**	• Community empowerment	**MODERATE**	• Employment will be provided to local people wherever possible, especially as unskilled construction workers and security guards	**NO IMPACT**	CSR Activities should be finalized and directed to the team for implementation	Project Developer/ Contractor under the supervision of RSSPL's Personnel
				• Developmental needs and expectations (such as employment in the project or up-gradation of educational health care facilities, cultural property and infrastructure) of local communities will be identified through the Gram Panchayat, villagers and local administration.		Should be conducted continuously through the project cycle.	RSSPL's Personnel
				• Opportunities for contributing to the economic and developmental needs of villagers through skill training will be explored.		Should be conducted continuously through the project cycle.	RSSPL's Personnel
2	**OCCUPATIONAL HEALTH AND SAFETY OF WORKERS**	• Electrocution • Firing due to short-circuit • Diseases due to unhygienic condition	**MODERATE**	• Provide and ensure wearing of personal protective equipment's viz., gloves, helmets, ear plug, etc. • Ensure effective work permit system for critical activities such as electrical work • Prepare emergency communication system and emergency preparedness plan • Ensure proper sanitation facilities.	**LOW**	Periodic EHS audits	Project Developer / RSSPL's Personnel

7.4 Environmental Monitoring Plan

The Environmental Monitoring Plan is formulated to ensure and demonstrate compliance with the Regulatory and Institutional Agency's EHS requirements. Monitoring of environmental and social parameters and comparing them with benchmarks set by regulatory and institutional authorities will help RSSPL assess the environmental performance and identify gaps or non-conformance ensuring immediate actions. The following environmental parameters (**Table 6.2)** will be monitored as when required during project operational phase for compliance.

Table 7-2: Environment Monitoring Program

A. Environmental Quality Monitoring

EQI No	Environmental Quality Indicator (EQI)	Monitoring Parameter	Location	Period & Frequency
A.	**CONSTRUCTION PHASE**			
A1	Ambient Air Quality	Measurement of $PM_{2.5}$, SOx, NOx, CO	Korampally, Yelakurthy and Salojipally village	Once during construction phase
A2	Ambient Noise quality	Measurement of Noise Pressure Level in dB(A)		Once during construction phase
A3	Ground Water quality	IS 10500 parameters		Once during construction phase
A4	Surface Water quality	IS 10500 parameters	Nearby surface water body	Once during construction phase
A5	Soil Quality	Soil parameters viz. pH, SAR, Water holding capacity, Conductivity, Organic Carbon, NPK	Abutting village land & project site	Once during construction phase

7.5 Environmental Management Plans

The ESMP is comprised of some site specific management plans viz. Emergency Management Plan, Waste Management Plan, Storm Water Management Plan, Environmental Monitoring Plan, Traffic Management Plan and Social Development Plan for the Renew Power 65 MW Solar Power Plant at Medak District of Telangana. The management plans will be executed through Environmental Social Management System.

7.5.1 Emergency Preparedness and Response Plan

Purpose

ReNew Power will develop a site specific Emergency Management Plan for implementation at the proposed site in the event of an emergency situation so that the loss of life and damage to the properties & natural resources are minimized as per the recommendation provided in this report. This plan outlines a series of emergency actions that will be executed by RENEW POWER & its Contractors to ensure preparedness and response to emergency situations throughout the life-cycle of the project.

Emergencies

The emergency situations that are probable to occur at the site and the probable causes are listed below:

- Fire at site during temporary construction phase which cannot be doused by fire extinguishers; Also fire due to short circuit at the plant and equipment during both construction & operation phase.
- Collapse of any structure
- Outbreak of endemic disease among a large section of construction workers due to contaminated drinking water, unhygienic conditions that have developed at workplace;
- Protests by the local community or other stakeholders at any point of the project lifecycle due to grievances;
- Serious injury or death of employee or sub-contracted worker at work, due to non-work related illness or work-related accident.
- Onset of any natural disaster like earthquake.

Emergency Management

The following steps shall be taken to ensure proper management of emergency or crisis situations:

- The nearest civil hospitals, private health care centres or practitioner clinic shall be identified and a agreements shall be made with the aforesaid medical centres/practitioners to provide prompt health care services (including ambulance services) in the event of an emergency situation at site.
- A list of important telephone numbers such as fire brigade, health care facility/practitioner, police station, EHS and Social Coordinator, project office, head offices shall be displayed at all the prime locations at site & the worker's camp (during construction phase).
- Regular liaising with the police, Gram Panchayat, district administration shall be carried out to ensure that prompt assistance is readily available in the event of an emergency.
- An Emergency Management (including Disaster Management) team comprising of 4-6 professionals both from the developer and contractors' side, during construction phase and 2-3 professionals during operation of the proposed project; shall be formed to combat any emergency situation and ensure safety of the life and property at site. For this purpose 2-3 personnel employed in the plant during operation phase shall be trained during emergency scenarios and their management measures including their roles and responsibilities in case of an emergency situation.
- The workers (staff & contractual workers from both Renew Power & contractors) shall be trained on their duties and emergency preparedness during an emergency. In case of an emergency, all site personnel shall be trained to follow the communication lines given below:
  - Personnel at site affected by the emergency situations immediately inform the project office and the external agencies (such as police, fire brigade, ambulance services); In case, project office cannot be reached, the coordinator will be informed directly;
  - The HSE officer on being informed about the emergency by project offices or by the employee directly; reaches site if necessary, and also follows-up with the aforesaid external agencies for aid;
  - The HSE coordinator takes charge of the emergency response and direct further action and co-ordination, including escalating the matter to the CEO or other top-level managers as required.

Responsibilities

The HSE coordinator will be responsible for implementing this procedure, which includes

- Ensuring that the emergency preparedness measures are in place;
- Providing training to the personnel at site regarding reporting of the emergencies, and to site office personnel regarding response to emergency calls from the site personnel,

- Direct action-and co-ordination at the time of an emergency

Community health and safety hazards specific to solar energy facilities primarily include the following:

Public Access: Safety issues may arise with public access to solar plant site or to the solar energy facility substation. Any public rights of way located within and close to the solar energy facility site should be identified prior to construction to establish any measures that may be required to ensure the safety of their users. Prevention and control measures to manage public accesses include:

- Use gates on access roads.
- Where public access is not promoted to the site and/or there are no current rights of way across the site, consider fencing the solar energy facility site, to prohibit public access to the plant site.
- Provide fencing of an appropriate standard around the sub-station with anti-climb paint and warning signs.
- Post information boards about public safety hazards and emergency contact information.

7.5.2 Community Engagement Plan

The Community Liaison Plan is a critical element of the overall Social Management Plans. Regular transparent communication between both the project and the communities and vice versa is crucial in building positive relationships between the two parties. This relationship should be crucial for managing unexpected situations which might arise during the course of the project. This plan should be read with other social management plan because the liaison which needs to be done for the individual plan is detailed within the plan. The communication plan mainly focuses on the communication issues during the construction stage however it also includes some community Liaison measures for the operation phase as well.

Objectives:

The Performance Standards mandates continuous communication between project and the different stakeholders e.g. workers, local community. The onus of initiating the process of communication rests on the project proponent. The project proponent should ensure that disclosure of relevant project information that would help the affected communities understand the risks, impacts and opportunities of the project. The Community Liaison Plan is developed to ensure a clear communication channel between the project and the local community. Even though the focus of the plan is primarily on communication with the community areas where there are likely interactions between the community and the contractors such areas have also been covered. The community liaison plan would concentrate on the following aspects:

Communication with the Community: As mandated in the Performance standards Renew Power has disclosed the project details to make the community aware of the important features of the project. A project information booklet would be prepared and distributed in the project affected villages. This booklet should preferably be presented in local language. The booklet in addition to containing the salient features of the project should have a map depicting the boundaries of the plant and its ancillary facilities. The important landmarks e.g. the settlement, schools and the roads, etc. should also be demarcated so that it becomes easy for the people in the villages to relate to the ground conditions. In addition to the project information the booklet should also highlight the impacts on the community as presented in the ESIA document and the commitments for the safeguards including the entitlement matrix. To ensure wide circulation of the Project Information Booklet, the booklet would be made available at all the schools, Anganwadi centres, and other public facilities in the project affected village. To ensure continuity of the flow of information to the community it is suggested that a quarterly

Community Information Booklet should be published. During the construction phase the booklet would contain the information about the progress of the project and also information which are pertinent to community e.g. disruption of the transportation links, outcome of consultation process on community development etc. It is proposed that the community Information Booklet be continued even during the operations stage where this also acts as a transfer of information from the project to the community. In addition it can also be used to share information between the communities e.g. achievement of a particular member of the community or any worker can be published in this booklet.

7.5.3 Waste Management Plan

The Waste Management Plan (WMP) will be applicable to the wastes arising during commissioning and operation of the proposed solar power plant of Renew Power. Major waste streams from the project include non-hazardous solid waste, wash water generated from panel washing and sewage. WMP is intended to serve as a guideline for Renew Power and the contractor(s) to manage wastes effectively during the project life cycle. The WMP describes how wastes will be managed during the project life cycle and how the project will:

- Minimize the potential to cause harm to human health and the environment.
- Comply with Indian Environmental Regulation, ADB guidelines and IFC Performance Standards.
- Reduce operational costs and reduce any potential liabilities which may arise from waste handling operations.
- This plan also ensures that every waste stream and solid waste materials from the main plant site and bracketed facilities will be managed effectively.

The EPC contractor (Sterling & Wilson) will manage the waste generated during construction phase like construction debris, packing material, paint containers and filters. The management measures of the aforementioned solid wastes and the hazardous wastes are discussed in details below:

- The recyclable and non-recyclable non-hazardous solid waste generated onsite should be collected and stored in a temporary waste storage facility from where all wastes will be sent for recycling and disposal to appropriate facilities.
- The reusable wastes like wooden waste and cardboards from packing materials, empty cement bags, construction debris, etc. can also be given to locals for their use or give it back to original equipment manufacturer (OEM).

7.5.4 Storm Water Management Plan

The purpose of Storm Water Management Plan (SWMP) is to ensure prevention and control of any adverse impact caused by un-regulated storm water runoff from the main plant to the nearby natural drainage channels, surface water bodies, public and private properties.

Following measures will be taken as part of the Storm Water Management Plan:

- The peripheral drains will be provided outside the plant boundary during construction phase, which will prevent the silt contaminated surface run-off from site to enter into the adjoining lands.
- No surface run-off from within the solar power plant site will be directly discharged into any nallah/water body.
- Rain water collected from the project site will be used to recharge the ground water through onsite rain water harvesting tank/pits.
- Do not result in concentrated flows into natural watercourses i.e. provision should be made for temporary or permanent measures that allow for attenuation, control of velocities and capturing of sediment upstream of natural watercourses.

- Do not result in any necessity for concrete or other lining of natural watercourses to protect them from concentrated flows off the development.
- Do not divert flows out of their natural flow pathways, thus depriving downstream watercourses of water.

7.5.5 Community Property Resource

During the project construction phase there might be some sharing of resources by the villagers and the workers working on the project. To an extent feasible this should be avoided to prevent potential conflicts between the project and the community. The movement of heavy vehicles and machineries might lead to conditions like disruption of electric wires and telephone wires in the project area and along transportation routes. All these damage utilities should be repaired/replaced to normal conditions, at the earliest. An account of the damage to the community resource should be documented and the root cause analysis carried out. The findings of the root cause analysis should also be documented and discussed with the agency/agencies found responsible for the incident. No water should be extracted from surface water bodies which are used by the community for drinking or domestic purpose. Any vacant or barren land, not assigned for project, should not be used for storage of fill/construction material, wastes, etc.

Renew Power and its contractors should ensure that the sharing of community resource is minimized by organizing necessary support infrastructure/facilities within premises. However, in case where sharing would be essential Renew Power (including contractors) should have an agreement with the Gram Sabha for the sharing of the resource. In case of damage to community property Renew Power including its contractors should ensure that it is repaired or replaced to the satisfaction of the community at the earliest. Renew Power should maintain documentation of all incidents of damages to the community property. All cost for repair/replacement should be borne by Renew Power /contractor. As part of the Environmental and Social Management System proposed, a system should also be developed for recording such incidents and tracking the incident till it is closed to the satisfaction of the community.

7.5.6 Occupation Health and Safety Management Plan

The Occupational Health and Safety (OHS) of the employee and contractual labours will be maintained at the work sites during both construction and operation phase. The OHS Management measures shall comply with the Indian Regulatory requirements under OHSAS and the Factories Act.

Construction Phase: The following occupation health and safety measures will be adopted during the construction phase:

- Currently, the workers should be provided PPE's like face shields, helmets, goggles etc. However, it should be ensured that all workers wear their proper personal protective equipment (PPEs) i.e. safety shoes and goggle, helmet, coverall, gloves, ear plugs etc. as per their nature of work during construction related activities to ensure health and safety of workers at workplace.
- Ensure provision and maintenance of drinking water and sanitation facilitation for construction workers in accordance with the provision of Contract Labour Act and Building and Other Construction Workers Act.
- Periodic cleaning of work areas will be undertaken and supervised by the contractors to ensure hygienic conditions on site.
- Workers will stop working in extreme natural climatic conditions i.e. heat wave, heavy rain etc.
- All work places will have adequate fire alarms and firefighting equipment's to handle any outbreak of fire in O& M.

- Adequate drinking water will be supplied at workplace for workers onsite and water quality meets drinking water quality standards. Renew Power needs to ensure it through its contractors.
- Sufficient light and ventilation will be provided for workers working in confined space.
- Periodic health check-up camps for workers onsite will be organized to ensure prevention of occupational health hazards.
- All work areas should have First Aid kits to manage injuries occurring in the area.
- The switchyard building will be provided with fire extinguishers and sand buckets at all strategic locations to deal with any incident of fire.

Operational Phase: Although no significant occupational health and safety risks are identified during operations, the following mitigation measures need to be adopted:

- Operators are provided with adequate PPEs depending upon nature of the operation and occupation health and safety risks associated with it viz. electrical maintenance activities etc.
- Special emphasis on electrical safety will be laid and all employees will be trained in electrical safety and First Aid
- Standard Operation Procedures (SOPs) will be developed for operational activities likely to have potential occupational health and safety risks
- Periodic medical examination will be undertaken for workers including contractor and subcontractor of the plant.
- Periodic inspections will be carried out to ensure all the above are implemented and any non-conformances will be recorded along with grievance related to OHS issues.
- An EHS coordinator will effectively implement and monitor the OHS Management System and ESMP.

7.5.7 Road Safety and Traffic Management Plan

The plan encompasses the addressal of community safety related impacts that may arise from the increased vehicular traffic due to movement of heavy equipment/machineries and vehicles along the site access and approach roads particularly during construction phase. The plan will be regularly updated by the contractor with the project progress and as vehicle movement requirements are identified in detail. Designated traffic coordinator will be responsible for overall coordination of traffic management.

During Construction Phase: The following mitigation measures will be implemented during this phase:

- Project vehicular movement will be restricted to defined access routes.
- Proper signage will be displayed at important traffic junctions along the vehicular access routes to be used by construction phase traffic. The signage will serve to prevent any diversion from designated routes and ensure proper speed limits are maintained near residential areas.
- Any road diversions and closures will be informed in advance to the project vehicles accessing the above route. Usage of horns by project vehicles will be restricted near sensitive receptors viz. schools, settlements etc.
- Traffic flows will be timed wherever practicable during period of increased commuter movement in the day.
- Temporary parking facilities shall be provided within the work areas and the construction sites to avoid road congestion.
- Vehicular movement to be controlled near sensitive locations viz. schools, colleges, hospitals identified along designated vehicular transportation routes.

- Routine maintenance of project vehicles will be ensured to prevent any abnormal emissions and high noise generation.
- Adequate training on traffic and road safety operations will be imparted to the drivers of project vehicles. Road safety awareness programs will be organized in coordination with local authorities to sensitize target groups viz. school children, commuters on traffic safety rules and signage.
- The contractor(s) shall frame and implement a "No Drug No Alcohol" Policy to prevent road accidents/incidents.

During Operational Phase: Since limited vehicular movement is anticipated during operational phase considering only the daily movement of project personnel any impacts arising from the same can be effectively addressed through implementation of mitigation measures as discussed during the construction phase. In addiction following measures will be emphasised.

- Use of horns near the villages along the access road to villages, main plant and internal roads shall be restricted.
- The vehicular movements along the access roads and highways shall be restricted during the night time.
- All the vehicles entering the access roads and plant shall have Pollution under Control (PUC) certificates.
- The speed limit in the internal roads shall be restricted to 25 km/hr. Proper warning signs and road safety awareness posters shall be displayed to create road safety awareness among the personnel accessing the site.
- Periodic road safety and Traffic management campaigns and awareness sessions shall be carried out among the villagers and the plant workers/personnel to develop road safety awareness among the people likely to be impacted by the project.
- An emergency road safety plan shall be framed by the Proponent to combat any emergency conditions/accidents along the highways, access roads and within plant area.
- The Proponent shall frame and implement a "No Drug No Alcohol" Policy to prevent road accidents/incidents.
- The drivers shall be given an induction on road safety and traffic management policy.
- A permanent parking lot shall be provided within the main plant site (in individual work areas) and the associated facilities.
- Use of seat belts for both drivers and passengers shall be made compulsory to minimize death & injuries in the event of an accident.

8 CONCLUSION

The proposed project can be categorized as ***Category B*** as per ADB's guidelines which specifies that this project is expected to have limited adverse environment and social impacts which, can be mitigated by adopting suitable mitigating measures.

An environment and social analysis has been carried out looking at various criteria such as topography, air, noise, water resources and water quality, ecology, demography of the area, climate, natural habitat, community and employee health and safety etc.

Brief Assessment of Project:

- **Location of project site in ecologically sensitive area**: No ecologically sensitive area exist within and surrounding of project site (up to 10 km from the project site)
- **Source of Pollution**: The proposed solar power project is based on clean technology and does not cause pollution. Further, proposed project will help to reduce GHG emissions.
- **Resettlement:** No resettlement and rehabilitation involved in the project.
- **Community Willingness**: community is aware about the project and does not show unwillingness for the project due to clean technology. Further, landowners have provided their land on willing to sell and willing to buy basis
- **Project Benefit**: The produced electricity will be evacuated to the state electricity grid located at Minpur and will help to cater the energy requirement
- **Gender and Social Inclusion**: The CSR plan focused on community development and women empowerment will be implemented by the Renew Power
- **Indigenous People**: The project site does not fall under scheduled area. Also, no land has been taken from ST people therefore negative impact and impact due to loss of livelihood on indigenous people is not anticipated.

There is no adverse impact on the nature of habitat, any natural existing land resources and effect in the regular life of people. There is no impact on cultural resources as well as indigenous people. Most impacts are expected to occur during the construction phase which are considered to be of a temporary in nature. The main project impacts are associated with clearing of shrub vegetation, waste management and excavation and movement of soils. From this perspective, the project is expected to have a small "environmental footprint". No endangered or protected species of flora or fauna are found at any of the subproject sites. Adequate provisions have been made for the environmental mitigation and monitoring of predicted impacts.

The proposed project will have number of positive impacts which are:

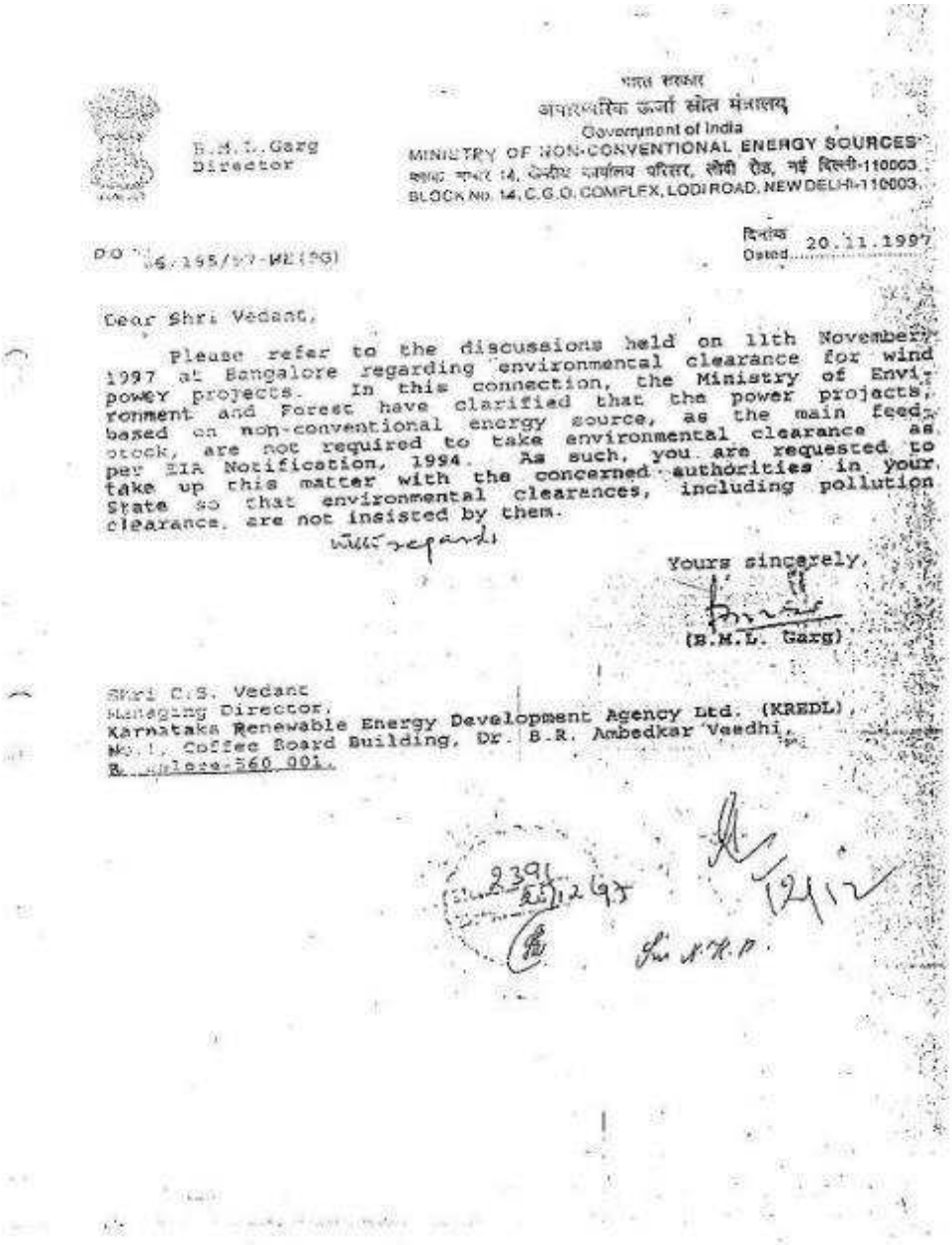
- The land has been procured for the project on willing to buy and willing to sell basis for which adequate compensation (i.e. more than the circle rate has been given to the land sellers). No economic and physical displacement happened in the project.
- During the construction phase, local populations often supply manpower for services such as those of drivers, vehicle vendors, contractors, watchmen etc.
- Natural drainage channels/ reservoirs exist adjacent and near the project site. It should not be disturbed. To rule out future storm water problems, storm water channels are planned along the periphery of the project site.

Proper Grievance Redressal Mechanism (GRM) will have to be implemented by Renew Power to overcome public inconvenience during the proposed project activities. Based on the environmental and

social assessment and surveys conducted for the project, the potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the mitigation measures identified in the EMP.

Therefore, setting up of the proposed Solar Power plant at the proposed site will not degrade the quality of surrounding environment, while improving the socio-economic conditions of the surrounding area.

APPENDIX A: MOEFCC NOTIFICATION



भारत सरकार
अपरंपरागत ऊर्जा स्रोत मंत्रालय
Government of India
MINISTRY OF NON-CONVENTIONAL ENERGY SOURCES
ब्लाक संख्या 14, केन्द्रीय सचिवालय परिसर, लोदी रोड, नई दिल्ली-110003
BLOCK NO. 14, C.G.O. COMPLEX, LODI ROAD, NEW DELHI-110003.

B.M.L. Garg
Director

D.O. No. 6/195/97-WE(PG)

दिनांक 20.11.1997
Dated

Dear Shri Vedant,

Please refer to the discussions held on 11th November, 1997 at Bangalore regarding environmental clearance for wind power projects. In this connection, the Ministry of Environment and Forest have clarified that the power projects, based on non-conventional energy source, as the main feedstock, are not required to take environmental clearance as per EIA Notification, 1994. As such, you are requested to take up this matter with the concerned authorities in your State so that environmental clearances, including pollution clearance, are not insisted by them.

With regards.

Yours sincerely,

(B.M.L. Garg)

Shri C.S. Vedant
Managing Director,
Karnataka Renewable Energy Development Agency Ltd. (KREDL),
No. 1, Coffee Board Building, Dr. B.R. Ambedkar Veedhi,
Bangalore-560 001.

APPENDIX B: EXEMPTION OF CONSENT TO ESTABLISH AND CONSENT TO OPERATE FOR WHITE CATEGORY INDUSTRY (SAMPLE PAGES)

केन्द्रीय प्रदूषण नियंत्रण बोर्ड
CENTRAL POLLUTION CONTROL BOARD

No.B-29012/ES5(CPA)/2015-16/ March 07, 2016

To

The Chairman
All the State Pollution Control Boards / Pollution Control Committees
(List Attached)

SUB: MODIFIED DIRECTIONS UNDER SECTION 18(1)(b) OF THE WATER (PREVENTION & CONTROL OF POLLUTION) ACT, 1974 and THE AIR (PREVENTION & CONTROL OF POLLUTION) ACT, 1981 REGARDING HARMONIZATION OF CLASSIFICATION OF INDUSTRIAL SECTORS UNDER RED / ORANGE / GREEN / WHITE CATEGORIES.

WHEREAS, under section 16 (2)(b) of the Water (Prevention and Control of Pollution) Act, 1974 and under Section 16 (2)(c) of the Air (Prevention & Control of Pollution) Act, 1981, one of the functions of the Central Pollution Control Board (CPCB), constituted under the Water (Prevention and Control of Pollution) Act, 1974, is to coordinate activities of the State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs), and

WHEREAS, under section 16 (2)(c) of the Water (Prevention and Control of Pollution) Act, 1974 and under Section 16 (2)(J) of the Air (Prevention & Control of Pollution) Act, 1981, one of the functions of the CPCB is to provide technical assistance and guidance to SPCBs and PCCs; and

WHEREAS, it was brought to the notice of CPCB, that different SPCBs /PCCs were following different criteria for classification of industrial sectors under Red/Orange/ Green category and that classification was being used by the SPCBs/PCCs for grant of consents to industries and for Inventorization / surveillance of industries.

WHEREAS, the issue regarding classification of industries was deliberated upon in the 56th Conference of Chairmen & Member Secretaries of CPCB & SPCBs/PCCs held on August 31, 2010 and a working group comprising of representatives from SPCBs & CPCB was constituted to prepare a consolidated list of industrial sectors falling under Red/Orange/Green category to bring uniformity in classification of industrial sectors across the country,

परिवेश भवन, पूर्वी अर्जुन नगर, दिल्ली-110032
Parivesh Bhawan, East Arjun Nagar, Delhi - 110032

WHEREAS , based on the series of consultations with SPCBs, different Government / Non-government Institutions including industries and MoEFCC , the following criteria on 'Range of Pollution Index 'for the purpose of categorization of industrial sectors has been finalized:

- Industrial Sectors having Pollution Index score of 60 and above – Red category
- Industrial Sectors having Pollution Index score of 41 to 59 -Orange category
- Industrial Sectors having Pollution Index score of 21 to 40 -Green category
- Industrial Sectors having Pollution Index score incl. & upto 20 -White category

WHEREAS, based on the revised criteria, the 'Final Report on Revised Categorization of Industrial Sectors under Red/Orange/Green/White' has been evolved. The 'Categorization' is based on the relative pollution potential of the industrial sectors and grouping of the industrial sectors based on the use of raw materials, manufacturing process adopted and pollutants likely to be generated.

WHEREAS, based on relative Pollution Index, the number of industries in various categories are as under :

i. The Red category of industrial sectors: 60
ii. The Orange category of industrial sectors: 83
iii. The Green category of industrial sectors: 63 and
iv. The Newly introduced White category: 36

WHEREAS, there shall be no necessity of obtaining the Consent to Operate" for White category of industries and an intimation to concerned SPCB / PCC shall suffice;

WHEREAS, the purpose of categorization is to ensure that the industry is established in a manner consistent with the environmental objectives and to prompt industrial sectors to adopt cleaner technologies, ultimately resulting in generation of no or minimum pollutants.

WHEREAS the new categorization system shall also facilitate in self-assessment by industries;

Now, therefore, in exercise of the powers delegated to the Chairman, CPCB under Section 18(1)(b) of the Water (Prevention & Control of Pollution) Act, 1974 and Section 18(1)(b) of the Air (Prevention & Control of Pollution), Act , 1981 the earlier Directions issued in June 2012 in the context of categorisation of industries as Red, Orange & Green are withdrawn with immediate effect and following **'Directions'** are hereby issued for compliance by all SPCBs and PCCs :

APPENDIX C: ILO GUIDELINES

No.6

ILO HELPDESK

ASSISTANCE@ILO.ORG

International Labour Organization

Workers' housing

Housing provided to workers as part of the employment contract should meet certain minimum specifications in respect of the nature and standard of the accommodation and facilities to be made available.

The following guidance is based on international labour standards. National or state regulation will often set baseline specifications as part of housing, labour, health or even fire safety regulations; they should be checked and followed. National employers and workers organizations may also be a good source of information on national law, collective bargaining agreements and customs pertaining to housing for workers; or may be able to refer you to the appropriate statutory authority.

Guiding principles

➡ In providing worker[1] housing, the objective should be to ensure "adequate and decent housing accommodation and a suitable living environment"[2] for workers. This includes upkeep, improvement and modernization of housing and related community facilities.[3]

It is "generally not desirable that employers should provide housing for their workers directly".[4] Employers are encouraged to help their workers to obtain housing through autonomous private agencies, public housing schemes, or cooperatives.[5] This is because workers living at the work site on property owned or controlled by the employer tend to be less integrated into the local community, and more dependent on the employer. However, certain circumstances, such as when an undertaking is located far from normal centres of population, or where the nature of the employment requires that the worker should be available at short notice may require the employer to provide housing for his or her workers.[6]

If housing is provided by the employer "the fundamental human rights of the workers, in particular freedom of association, should be recognised."[7] Arrangements where accommodation and communal services are provided as payment for work should take care to ensure that the interests of the workers are protected. If rent is charged, it should not cost the worker more than a reasonable proportion of his or her income.[8]

Siting and construction

➡ The housing and related community facilities should be of durable construction, taking into account local conditions, such as liability to earthquakes.[9]

The location of workers' housing should ensure that workers are not affected by air pollution, surface run-off or sewage or other wastes.[10]

Housing Standards

➡ Housing should ensure "structural safety and reasonable levels of decency, hygiene and comfort".[11] The undertaking should ensure the following:

a) a separate bed for each worker;
b) adequate headroom, providing full and free movement, of not less than 203 centimetres;
c) the minimum inside dimensions of a sleeping space should be at least 198 centimetres by 80 centimetres;
d) beds should not be arranged in tiers of more than two;
e) bedding materials should be reasonably comfortable;
f) bedding and bedframe materials should be designed to deter vermin;
g) separate accommodation of the sexes;
h) adequate natural light during the daytime and adequate artificial light;
i) a reading lamp for each bed;
j) adequate ventilation to ensure sufficient movement of air in all conditions of weather and climate;
k) heating where appropriate;
l) adequate supply of safe potable water;
m) adequate sanitary facilities (see below);
n) adequate drainage;
o) adequate furniture for each worker to secure his or her belongings, such as a ventilated clothes locker which can be locked by the occupant to ensure privacy;
p) common dining rooms, canteens or mess rooms, located away from the sleeping areas;
q) appropriately situated and furnished laundry facilities;
r) reasonable access to telephone or other modes of communications, with any charges for the use of these services being reasonable in amount; and

[1] Workers' Housing Recommendation, 1961 (No. 115). The section entitled "Suggestions concerning methods of application," Part I, paragraph 6, encourages "equality of treatment between migrant workers and national workers". Therefore, this guidance applies equally to migrant workers and national workers.
[2] R. 115, General Principles, Part II, paragraph 2.
[3] R. 115, paragraph 3.
[4] R. 115, Part IV, paragraph 12(2).
[5] R. 115, Part IV, paragraph 12(1).
[6] R. 115, Part IV, paragraph 12(2).
[7] R. 115, Part IV, paragraph 12(3a).
[8] R. 115, Part II, paragraph 4, Part IV, paragraph 12(3c) and (4).
[9] R. 115, Suggestions Concerning Methods of Application, Part I, paragraphs 10-11.
[10] R. 115, Suggestions Concerning Methods of Application, Part IX, paragraph 63.
[11] R. 115, paragraph 19.

s) rest and recreation rooms and health facilities, where not otherwise available in the community.

In workers' sleeping rooms the floor area should not be less than 7.5 square metres in rooms accommodating two persons; 11.5 square metres in rooms accommodating three persons; or 14.5 square metres in rooms accommodating four persons. If a room accommodates more than four persons, the floor area should be at least 3.6 square metres per person. Rooms should indicate the permitted number of occupants.

As far as practicable, sleeping rooms should be arranged so that shifts are separated and that no workers working during the day share a room with workers on night shifts.

Sanitation facilities

➡ Adequate sanitary facilities should include a minimum of one toilet, one wash basin and one tub or shower for every six persons. They should be provided at a convenient location which prevents nuisances. Sanitary facilities provided should meet minimum standards of health and hygiene. They should also provide reasonable standards of comfort, including hot and cold fresh running water. There should be separate sanitary facilities provided for men and for women. Sanitary facilities should have ventilation to the open air, independently of any other part of the accommodation. Soap and hygienic paper should be adequately stocked.

Health and safety

➡ As far as possible, floors walls, ceilings and equipment should be constructed to minimize health risks.

The accommodations should be kept free of rats, mice, insects and vermin. In areas where mosquitoes are prevalent, workers should be provided netting.

Measures should be taken to prevent the spread of diseases. Separate facilities should be provided for sick workers to prevent the spread of transmissible diseases among the occupants. Fire safety measures should be taken, including installing and maintaining fire equipment (alarms, extinguishers, etc.). Workers should be trained in fire procedures. Bedding should not contain flammable materials. Radiators and other heating apparatus should be placed so as to avoid risk of fire, and shielded where necessary to prevent discomfort to occupants.

Safety exits should be clearly marked. Adequate means of escape should be provided and properly maintained.

Provisions should be made for workers' physical safety and well-being, and protection of their belongings. Measures should be reasonable and not unduly restrict workers' freedom of movement. Workers should be allowed visits for social relations or business, including trade union business.[12]

Inspection of premises

➡ Premises should be inspected frequently to ensure that the accommodation is clean, decently habitable and maintained in a good state of repair. The results of each such inspection should be recorded and be available for review.

Vacating the premises upon termination of employment

➡ When a worker's contract of employment is terminated, the worker should be entitled to a reasonable period of time to vacate the premises, in accordance with national law and custom.[13]

Consultation

➡ In the design of housing for workers, "every effort should be made to consult those bodies representative of future occupants best able to advise on the most suitable means of meeting their housing and environmental needs."[14]

References

➡ Workers' Housing Recommendation, 1961 (No. 115); full text available at: http://www.ilo.org/ilolex/english/recdisp1.htm.

➡ For comparison, you may also wish to consult the Maritime Labour Convention (MLC), 2006, Title 3, which gives detailed guidance for workers' accommodation for seafarers; full text available at: http://www.ilo.org/ilolex/cgi-lex/convde.pl?C186.

[12] R. 115, Suggestions Concerning Methods of Application, Part IV, paragraph 17.
[13] R. 115, General Principles, Part IV, paragraphs 12(3b) and Suggestions Concerning Methods of Application, Part IV, paragraph 15.
[14] R. 115, Suggestions Concerning Methods of Application, Part IX, paragraph 42.

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APPENDIX D: FRAMED SOCIAL QUESTIONNAIRE

Name of the village				*Panchayat*				
Tehsil/Block				*District*				
Respondent					*Date:*			
Total Population		*Total Male*			*Total Female*		*HH No.*	
Religion	*Name*	*%*		*Name*	*%*			
Caste/Group	*Name*	*%*		*Name*	*%*			
	Name	*%*		*Name*	*%*			
Education Level	*Illiterate %*	*Primary %*		*Secondary %*	*H.S. %*		*Graduate %*	
Occupation	*Agriculture %*	*Business %*		*Service %*	*Labour %*		*Other %*	
Source Drinking water facility	*Tube well*	*Dug well*		*Stream*	*Piped water*		*Hand pumps*	
Sanitation facility	*Pit latrine %*	*Sanitary latrine %*		*Open defecation %*	*Other %*			
Electricity (Available %)				*Electricity availability in HH*				
Village road type/transport facility								
Schools (distance)	*Primary*	*Middle*		*H. S.*	*College*		*Anganwadi*	
Health Facility (distance)	*Health sub Centre*	*Primary*		*Hospital*	*Others*			
Major diseases								
Major crops cultivated	*Name*	*Period*	*Yield (q/acr)*	*Rate/q*	*Name*	*Period*	*Yield (q/acr)*	*Rate/q*
Irrigation Facility	*Ponds*		*River*		*Groundwater*		*Others*	

Average land holding size					
Land rights					
Livestock	*Cow*	*Buffalo*	*Goat*	*Pig*	*Fowl*
	Duck	*Others*			
Grazing areas					
Cooking medium and source	*Fuel Wood*	*Kerosene*	*Cow Dung cake*	*Crop Residue*	*LPG*
	Others				
Common property Resources(CPR)	*Religious and cultural places*	*Sacred places*	*Community hall*	*community Ponds*	*Cremation ground*
	Streams	*canal*	*river*	*Others*	
Major rituals and festivals	*Name*	*Period*	*Name*	*Period*	
Fishing area		*Name of the*			
Forest	*Wood*	*Timber*	*NTFP*	*Others*	
Any Vulnerable Groups like- landless/homeless- people, Women headed HH, Orphans etc.					
Any program related to child / women health care program					
Any employment generation program					
HH & Cottage industries in the village / area					
Any proposed Scheme / Program related infrastructure / any amenities					
Occurrence any Natural Calamities / industrial / anthropogenic Hazard					

APPENDIX E: PROTECTED MONUMENTS IN MEDAK DISTRICT

Sl.No	Name of the Monument	Village	Mandal	Period
1	Hill Fort (Built by Rajas of Warangal)	Medak	Medak	14th —15th C.A.D
2	Mubarak Mahal	Medak	Medak	16th C.A.D
3	Qutub Shahi Mosque, Arab Khan Mosque and Inscriptions	Medak Fort	Medak	17th C.A.D
4	Inscriptions(Inscription carved on a Granite Slab)	Medak	Medak	16th C.A.D
5	Hindu Temples & Inscriptions	Kondapaka	Kondapaka	13th C.A.D
6	Stone Circles	Attapur	kalabgur	10th -9th C.A.D
7	Proto-Historic Burials	Kasipalli	Kalabgur	10th C.B.C.
8	Remains of Hindu Temples and Tombs	Patancheru	Patancheru	12th -15th C.A.D
9	Jaina Temples	Patancheru	Patancheru	13th C.A.D.
10	Ruined Tombs	Siddipet	Siddipet	16th C.A.D
11	Proto -Historic Burials	Ponnal	Siddipet	10th C.B.C
12	Proto -Historic Burials	Assany_alli	Kulcharam	10th C.B.C
13	Cairns	Merpadge	Kondapak	10th C.B.C
14	Old Mosque	Komatoor	Medak	17th C.A.D
15	Qutub Shahi Mosque	Andole	Andole	17th C.A.D
16	Cairns	Burgapalli	Yellareddi	10th C.B.C
17	Rakasigudi	Mandapally	Chinnakodur	10th C.B.C
18	Rakasigudi	Palamkul	Siddipet	10th C.B.C
19	Rakasigudi	Nermetta	Nanganoor	10th C.B.C.
20	Rakasigudi	Pullur	Nanganoor	10th C.B.C
21	Siva Temple	Duddeda	Kondapaka	13th C.A.D
22	Sri Ramalingeswara Swamy Temple	Nandikandi	Sadasivapet	12th C.A.D
23	Subedar Office Building	Patancheru	Patancheru	19th C.A.D
24	Kasivisweswaralayam	Kalbagur	Sangareddy	12th C.A.D
25	Ancient Temple	Edithanur	Sangareddy	13th C.A.D
26	Sri Venkateswara Rukmini Panduranga Temple	GadiMohalla	Zaheerabad	17th - 18th C.A.D
27	Sri Rechanna Swamy Temple	Badampet	Kohir	18th-19th C.A.D
28	Sri Sangameshwar Temple	Mogudampally (Upparpallytanda)	Zaheerabad	17th-18th C.A.D
29	Sri Kuchadri Venkateswara Swamy Temple	Kuchanpalli	Medak	
30	Sri Basaweshwara Swamy Temple	Jharasangam	Jharasangam	
31	Sri Trilingeswara Alayam	Yellareddypet	Thoguta	

Source; Archaeology survey of India/Telangana

APPENDIX F: SUMMARY OF STAKEHOLDER'S CONSULTATION

Stakeholder Group	Village/ Department	Name	Methodology	Findings
Project Proponent	ReNew Saur Shakti Private Limited (RSSPL)	Mr. Bhadru, Project Site Manager Mr. Raju, Project Site Engineer	One to one Interaction	• Land Procurement in project area villages, viz. Korampally (200 Acres) and Yelakurthy (120 Acres) of Tekmal Mandal in Medak district, is almost completed. • Land in Salojipally (tentatively 125 Acres) is identified and on way of procurement. • NOC from all the villages mentioned is yet to be procured. • As per GoI notification for White Projects through CPCB no CTE & CTO is required. Hence no such requirement is essential for the proposed 65 MW Solar Power Project. In line those are also applicable for the SPCBs and for those, including projects, who are coming under their jurisdiction.
Sub Registrar	Land Registration Office, Jogipet	Mr. Manne Solomon	One to one interaction	• Land Circle rate for dry and wet lands at Korampally is Rs. 90, 0000 is Rs.1, 50000 respectively; at Yelakurthy is Rs. 1, 10000 and Rs. 1, 50000 respectively and at Salojipally is Rs. 1, 50000 and Rs. 1, 60000 respectively. • The rates that had been offered to the Land Owners, are higher than the Circle rates.
Land Aggregator	For RSSPL	Mr. Kandipally Manaya	One to one interaction	• Land Aggregator for all the project area villages viz. Korampally, Yelakurthy and Salojipally is the same person. • Land aggregator has individually approached to land owners during land procurement process. • Agreement to Sale with the Land Owners in Korampally and Yelakurthy villages is almost completed. • All the required private lands for each project area villages has been procured (for Plants and access roads) on the basis of agreement to sale and willing to buy.
Community	Korampally	Mr. Dasanath Mr. Papaiah Mr. Dasarath Ms. Sattamma Mr. Harikanth	Group Discussion	• Major livelihood in this area is agriculture. • The main crops are Paddy, Corn, Jowar and Sugarcane etc. • There are also Livestock Farming. • Rain-fed as well as Irrigated agriculture pattern both are practiced in project area.

Stakeholder Group	Village/ Department	Name	Methodology	Findings
				• The main source for Irrigation in agriculture bore well and channel linkage from the Manjira River. • Female literacy rate is much lower than male literacy rate in all the study area villages. • Bore wells and centrally located Over Head Tanks are the main source of drinking water • Ground water depth is more than 60 ft. • Sanitation facilities are inadequate in the villages and a notable of the population are resort to open defecation. • No Health facility is available within the village. Nearest Health Care Facilities are also far enough. The only dependency area in this regard are the quacks. • Dental problem, joint pain and other general diseases are common problem in the area.. • Routine immunization programme is conducted. • The community is aware of the upcoming 65 MW Solar Power Project and is expecting betterment in their livelihood with the initiation of the same.
	Yelakurthy	Mr. Abdul Sattar Ms. K. Alaveri, Mr. G. Muglagaud Mr. Abdul Satttar Ms. K. Nilgamma	Group Discussion	• Major livelihood in this area is agriculture. • The main crops are Paddy, Corn, Jowar and Sugarcane etc. • There are also Livestock Farming. • Rain-fed as well as Irrigated agriculture pattern both are practiced in project area. • The main source for Irrigation in agriculture bore well and channel linkage from the Manjira River. • A new channel construction is on progress, adjacent to the project site, namely *Gunduwaju Channel* • Female literacy rate is much lower than male literacy rate in all the study area villages. • Bore wells and centrally located Over Head Tanks are the main source of drinking water • Ground water depth is more than 60 ft. • Sanitation facilities are inadequate in the villages and a notable of the population are resort to open defecation.

Stakeholder Group	Village/ Department	Name	Methodology	Findings
				• No Health facility is available within the village. Nearest Health Care Facilities are also far enough. The only dependency area in this regard are the quacks. • Dental problem, joint pain and other general diseases are common problem in the area.. • Routine immunization programme is conducted. • The community is aware of the upcoming 65 MW Solar Power Project and is expecting betterment in their livelihood with the initiation of the same.
	Salojipally	Ms. D. Lakshmi, Ms. Poshamma Mr. Kiran Mr. K. Nagalaya	Group Discussion	• Major livelihood in this area is agriculture. • The main crops are Paddy, Corn, Jowar and Sugarcane etc. • There are also Livestock Farming. • Rain-fed as well as Irrigated agriculture pattern both are practiced in project area. • The main source for Irrigation in agriculture bore well and channel linkage from the Manjira River. • Bore wells and centrally located Over Head Tanks are the main source of drinking water • Ground water depth is more than 60 ft. • Sanitation facilities are inadequate in the villages and a notable of the population are resort to open defecation. • No Health facility is available within the village. Nearest Health Care Facilities are also far enough. The only dependency area in this regard are the quacks. • Dental problem, joint pain and other general diseases are common problem in the area.. • Routine immunization programme is conducted. • The job opportunity is gradually declining and thereby the Social Order. • The local Brick Kiln is one of the resources besides agriculture for employment.
School Authority/ Staff	Salojipally	Ms. Anupama, (Assistant Teacher)		• Present enrolment is only 35. • Female literacy rate is much lower than male literacy rate in all the study area villages.

Stakeholder Group	Village/ Department	Name	Methodology	Findings
		Ms. Lakshmi (Mid-day meal Cook), Ms. Shyamamma (Cooking Assistant)		• The condition of the only elementary school is not good and needs upgradation in many regards like, sitting arrangements for pupils, running water facility in the toilets etc.
	Yelakurthy	Mr. K. Manaya		• The High School located within the village is working as a gateway for the local children and encouraging for pursuing higher education. Some of them has ventured in to higher education like B. Ed Training or Diploma Engineering etc. in the nearby institutes. • The school has their own running water resources and more than one Water Reservoirs located above roof and also above ground. • Thus also the female literacy is also increasing in the area. • Though the school needs more facilities to improve from the present situation.
Panchayat Members	Korampally	Mr. N. Chandraiyah & Mr. Muttaiyiah	Group Discussion	• It was informed by the Panchayat Members that they are aware of the 65 MW Solar Power project to be started in the village. • Some of the Panchayat Members are Land providers as well. • NoC is yet to be issued by the Panchayat. • The local people have aspirations from the upcoming Solar Power Project.
	Yelakurthy	Mr. K. Eshwaraiya	Group Discussion	• It was informed by the Panchayat Member that the local panchayat is aware of the 65 MW Solar Power project to be started in the village. • Some of the Panchayat Members are Land providers as well.
	Salojipally	Mr. Shahjahan Patel	One to one interaction	• It was informed by the Ex- Sarpanch that they are aware of the 65 MW Solar Power project to be started in the village.
Anganwadi Worker	Salojipally	Ms. Durgamma	One to one interaction	• There is only 1 Anganwadi Centre (AWCs) within the village. • The AWC is in the building exclusively meant for the purpose and located at the same premises of the only Primary School of the village. • The enrolment rate in the AWC is between 25 to 30 children. • Children, in the Anganwadi Centres normally sit on Floor Mats.

Stakeholder Group	Village/ Department	Name	Methodology	Findings
				• The biggest problem that the AWCs are facing that they don't have exclusive arrangements for drinking water in their centre. They have to fetch water from the centrally located, within the school premises Tap linked with the above ground reservoir shared with the elementary school. • The Anganwadi Worker has also informed that space within her AWC is inadequate to accommodate higher number of children. • The Anganwadi also need some facilitating aids for teaching the children.
Land Owners	Korampally	Mr. Chellapally Keshaiah, Mr. Chellapally Mugallaiah, Mr. Kallu Hanumanthu, Mr. Yellampalli Dasrath, Ms. Machkuru Satyamma, Mr. Kanirisetty Gyaneswar, Mr. Harikanth, Mr. Indra Reddy, Mr. Bupathi Reddy & N. Chandraiyah	One to One Interaction	• Land owners has sold lands directly to ReNew Saur Shakti Private Limited through Land Aggregator appointed by them on willing to sale willing to buy basis. • As informed due to the escalating cost for cultivation and rising labour cost, profit from Agriculture is gradually declining. Hence, the farmers and land owners were trying to look for more ensured profiting and supporting options. • The land owners are expecting betterment in their livelihood with the initiation of the 65 MW Project in the area. • It was informed by them that, the Land aggregator has individually approached to land owners during land procurement process.
	Yelakurthy	Mr. K. Anjaiah, Mr. K. Bhumaiya, Mr. K. Eshwaraiya, Mr. Yadul Hussain, Mr. Md. Hussain, Ms. T. Lakshmireddy, Ms. K. Narsamma, Mr. Kandipally Manaya, Mr. Sahid Ali & Mr. T. Ramareddy	One to One Interaction	• Land owners has sold lands directly to ReNew Saur Shakti Private Limited through Land Aggregator appointed by them on willing to sale willing to buy basis. • As informed due to the escalating cost for cultivation and rising labour cost, profit from Agriculture is gradually declining. Hence, the farmers and land owners were trying to look for more ensured profiting and supporting options. • The land owners are expecting betterment in their livelihood with the initiation of the 65 MW Project in the area. • It was informed by them that, the Land aggregator has individually approached to land owners during land procurement process.

APPENDIX G: CHECKLIST FOR PRELIMINARY CLIMATE RISK AND SCREENING

A Checklist for Preliminary Climate Risk Screening

Country/Project Title:
Sector :
Subsector:
Division/Department:

Screening Questions		Score	Remarks[22]
Location and Design of project	Is siting and/or routing of the project (or its components) likely to be affected by climate conditions including extreme weather related events such as floods, droughts, storms, landslides?		
	Would the project design (e.g. the clearance for bridges) need to consider any hydro-meteorological parameters (e.g., sea-level, peak river flow, reliable water level, peak wind speed etc)?		
Materials and Maintenance	Would weather, current and likely future climate conditions (e.g. prevailing humidity level, temperature contrast between hot summer days and cold winter days, exposure to wind and humidity hydro-meteorological parameters likely affect the selection of project inputs over the life of project outputs (e.g. construction material)?		
	Would weather, current and likely future climate conditions, and related extreme events likely affect the maintenance (scheduling and cost) of project output(s) ?		
Performance of project outputs	Would weather/climate conditions, and related extreme events likely affect the performance (e.g. annual power production) of project output(s) (e.g. hydro-power generation facilities) throughout their design life time?		

Options for answers and corresponding score are provided below:

Response	Score
Not Likely	0
Likely	1
Very Likely	2

Responses when added that provide a score of 0 will be considered low risk project. If adding all responses will result to a score of 1-4 and that no score of 2 was given to any single response, the project will be assigned a medium risk category. A total score of 5 or more (which include providing a score of 1 in all responses) or a 2 in any single response, will be categorized as high risk project.

Result of Initial Screening (Low, Medium, High):_____

Other Comments:_____
_____

Prepared by: _____

[22] If possible, provide details on the sensitivity of project components to climate conditions, such as how climate parameters are considered in design standards for infrastructure components, how changes in key climate parameters and sea level might affect the siting/routing of project, the selection of construction material and/or scheduling, performances and/or the maintenance cost/scheduling of project outputs.

APPENDIX H: STUDY AREA POPULATION DISTRIBUTION AND GENDER RATIO

Study Area	Total Population	Male	Female	Sex Ratio
District- Medak	3033288	1523030	1510258	992
Mandal- Tekmal	37879	18639	19240	1032
Yelakurthy	1622	799	823	1030
Korampally	1381	675	706	1046
Salojipally	800	350	450	1286

Source: Census, 2011

APPENDIX I: STUDY AREA VILLAGES SSCHEDULED CASTE POPULATION

Study Area	Total Population	Scheduled Caste Population
District- Medak	3033288	537947
Mandal- Tekmal	37879	7532
Yelakurthy	1622	469
Korampally	1381	223
Salojipally	800	240

Source: Census, 2011

APPENDIX J: LITERACY SCENARIO OF STUDY AREA VILLAGES

Study Area	Literate Population (%)	Male Literate (%)	Female Literate (%)
District- Medak	61.42	71.43	51.37
Mandal- Tekmal	48.51	60.09	37.41
Yelakurthy	52.50	65.10	40.54
Korampally	51.54	62.31	43.42
Salojipally	52.80	52.45	40.85

Source: Census, 2011

APPENDIX K: WORKFORCE PRACTICIPATION RATE IN STUDY AREA VILLAGES

Study Area	Total Population	Working Population	% Cultivators	% Agricultural Labourers	% Household Workers	% Other Sector Workers
District-Medak	3033288	1442203	24.49	39.60	4.69	31.22
Mandal-Tekmal	37879	19804	38.30	48.71	1.32	11.67
Yelakurthy	1622	892	34.30	43.61	0.67	8.18
Korampally	1381	777	5.02	46.98	0.00	5.28
Salojipally	800	440	81.00	46.00	0.00	11.36

Source: Census, 2011

Female Work Force Participation Rate

State	Working Female %
Telangana	53.50
District	**Working Female %**
Medak	51.37
Study Area Villages	**Working Female %**
Korampally	43.42
Yelakurthy	40.54
Salojipally	40.85

Source: Report on District Level Estimates for the State of Telangana, 2015-16 & Census, 2011

APPENDIX L: GRIEVANCE REDRESSAL MECHANISM AS PER RENEW ESMS

1. Labour Related Grievance

Labor is a critical issue and the availability of the same, both semi-skilled and skilled, is essential for the timely completion of construction related activities. The workers including the local, intrastate and interstate migrant workers are likely to have the grievance related to the following issues:

- Risk to health and safety of the laborers or workers hired by the Contractors;
- Working condition of the laborers;
- Wage discrimination among the laborers;
- Timing of the payments;
- Adequate facilities in the labor camps (during construction stages) including water supply and sanitation;
- PF, ESIC, Workmen's compensation, adequate health facility related issues;
- Unjustified deduction from the wages;
- Minimum wage rates for the laborers;
- Extended working hours;
- Prevention and protection of child labor from hazardous work condition;
- Issue of forced labor;
- Gender discrimination.

These issues will continue to emerge during the present operational phase and as and when the construction activities are taken forward by Renew.

Grievance Redressal Process for Labor Grievance

1.1.1. Step 1: Publicizing Grievance Management Procedures

A Labor Grievance Cell (LGC) would be set up at the corporate level comprising of requisite members from Human Resources department, QHSE, Project and Legal departments. The HR head of the company will also Head the LGC. At the individual project/site level, grievances would be handled by the assigned officer and the grievance addressal mechanism would be managed by the same along with members from project team, QHSE etc. as per requirement and availability. The site grievance officer would be responsible for reporting of details pertaining to labour grievances back to the LGC at the corporate level. The grievance mechanism at the project level is required to be displayed at strategic locations at the project office in regional language or Hindi, to enable labors and contractors to understand the procedure properly.

The existence of the grievance officer, the process of grievance handling and redressal and communication process needs to be reminded on a regular basis at the project sites in the various staff meetings, by project officers and other members associated with grievance handling through different forms like posters and flyers in regional languages or Hindi.

1.1.2. Step 2: Receiving and Keeping Track of Grievances

This step primarily involves the following stages:

- Collecting grievances from across projects on a periodic basis;
- Registering them in a central place;
- Tracking them throughout the processing cycle to reflect their status and important details;
- Back communication to the project level grievance cell for addressal of the issue

Grievance Receipt and Recording

The officer charged with collection of grievances (e.g., assigned grievance officer at the project office location, ESMS officer, or field staff authorized to take grievances) writes down complaints at group or individual meetings, during field visits, or at designated locations. The grievances are then deliberated upon at the site level for redressal with participants as per requirement from the project team and QHSE as per requirement for addressal. In case the grievances are deemed beyond addressal at the site level, the same are sent to the LGC in the pre-decided format in agreed frequency and communication mode as agreed between the corporate level LGC and the nodal grievance officer at the project level.

Registering of Grievances

The assigned grievance officer is to be the designated for administering company grievance mechanism at the project level. He is responsible for the collection of labour related grievances. The grievances of the labors should be recorded in a pre-set format, which should include:

- Grievance Date
- Village/ work Site
- Areas
- Name and gender of Complainant
- Details of the issue (Categorization can be done)
- Issue Related to concerned Dept.
- Present Status (Open, Closed, and Pending Status)
- Total time taken to close the grievance

Tracking the Grievances

The grievance officer will track the resolution status, coordinate it with the division(s) responsible for corrective actions, and maintain a record of progress (e.g. open, pending or closed).

A timeline should be assigned to each of the grievances or the total time taken to close the grievance.

The officer will track the resolution status, coordinates it with the relevant persons responsible for corrective actions, and maintains a record of progress (for example- open, pending or closed). Once the complaint is resolved, the grievance officer will presents a final status update on the incident to relevant management personnel. The officer will also periodically present an aggregated report on the status of complaints registered and addressal delivered.

1.1.3. Step 3: Reviewing and Investigating Grievances

The central unit or person responsible for grievance handling organizes the process to validate the complaint's legitimacy and arrange for investigation of details. To begin this process, the nature of the grievance is established to determine the measures needed for review and investigation. All grievances undergo some degree of review and investigation, depending on the type of grievance and clarity of circumstances:

- **Minor, straightforward issues** may only need screening before proceeding to the next step (resolution options and response). Review of minor issues, especially those related to a

complainant's request for information, can generally be handled easily by providing information on the spot, or referring the person to the designated representative from the project team.

- **Less clear, more problematic, or repetitive issues, or group complaints** may need a more detailed review prior to action. Staff involved in handling grievances may need to seek advice internally, and in some cases turn to outside parties to help in the validation process, especially in cases of damage claims.
- **Complex issues with multiple parties** may need investigation can be organized internally, or the company may designate third-party experts to investigate when impartiality is important or when complex technical matters are involved. If an extensive investigation is found to be necessary, it shall be initiated swiftly before circumstances change or the conflict escalates further.

1.1.4. Step 4: Developing Resolution Options and Preparing a Response

Rationale for Grievance Closure

- The requirements/need specified in the form of grievance by the aggrieved have been effectively addressed to the satisfaction of the complainant;
- Grievance considered to be duly addressed and closed by Renew

Process of the Grievance Redressal

- The person having grievance will come on the scheduled time and lodge the complaint the register with the designated grievance officer;
- The grievance if minor nature will be addressed at the site level grievance cell itself;
- In case the grievance is serious and required to be forwarded to the corporate level LGC/, the site grievance officer will forward the same to the LGC;
- He/ She will be heard by the concerned officer appointed by the LGC;
- The grievance will be processed in tandem with representatives from the LGC and concerned person will be informed through a written communication/Phone in case of urgency within seven days.
- On hearing from the grievance officer they have to come for further processing to the grievance redressal center if required.

1.1.5. Step 5: Monitoring, Reporting, and Evaluating a Grievance Mechanism

Monitoring and reporting can be tools for measuring the effectiveness of the grievance mechanism and the efficient use of resources, and for determining broad trends and recurring problems so they can be resolved proactively before they become points of contention. Monitoring helps identify common or recurrent claims that may require structural solutions or a change in the Labor policy, and it enables the company to capture any lessons learned in addressing grievances.

Monitoring Indicators

Grievance records will provide the background information for regular monitoring, both informal and formal. Depending on the nature of job in the project, the volume of grievances and monitoring measures will vary. Some of the monitoring indicators identified for future to monitor the effectiveness of this grievance mechanism are as follows:

- Tracking the number of grievances received and resolved;
- Apart from reviewing each grievance and analyzing effectiveness and efficiency, using complaints to analyze systemic deficiencies.
- Recognize patterns in the grievances the company receives, and how they are being resolved.
- Average time taken for resolution of grievances falling under particular category;

- Effectiveness of different solutions in addressing various category of grievances;
- Whether there are matters significantly affecting company policy or requiring legal review; and
- Whether the existing system meets requirements established by the company as well as the expectations of all stakeholders.

1.1.6. Step 6: Reporting and Recording

The project grievance officer on the basis of all grievances received, registered, documented and tracked will prepare a periodic report as per requirement and forward the same to the corporate LGC. The periodicity of the same would be decided at the discretion of RPVPL. Reports from multiple projects will assists in tracking overall trends and patterns in concerns allowing emerging labour issues to be flagged and understood during early stages of any project. The statistics generated from these reports on grievance handling and redressal may be included in action plans and annual reporting.

Manpower and Financial

Chief Grievance Officer

As already indicated above, the corporate level LGC of Renew should be headed by the Head- Human Resource who is the Chief Grievance Officer. At the site level, the grievance officer would be assigned by RPVPL as per availability and requirement of requisite individuals. In case the projects are being managed by third party contractors and labour grievances are being managed by their respective representative, RPVPL will ensure that data from the same is received by its project representative and the same periodically monitors the addressal and closure of grievances arising out of RPVPL's projects.

Department Representatives

Day to Day functioning of the cell is done through the representatives from the

- Departments of HR catering to labor and IR issues;
- Site in-charges of all the projects.
- Legal department for labor related legal compliance
- QHSE and their site level ESMS officers

Renew will ensure a budget allocation to deal with grievance tracking and handling.

TRAINING

Training shall be provided according to the company's policy and practices for Labor grievance mechanisms, relevant to their exposure and responsibilities for managers, all other project liaising employees, contractors and visitors, which shall include as a minimum:

- Expected behaviors and accepted practices when interacting with contractors, contractor employees, workers in order to avoid a grievance in the first instance;
- Routes available for Labors to lodge a grievances;
- Roles and responsibilities for handling and resolving grievances (including key internal and external stakeholder contacts), and;
- Recording and tracking procedures.

2. Redressal of Community Grievances

Community grievances are those grievances received from the external community related stakeholders such as project affected families, surrounding villages, local administrative setup and others. In the subsequent section, we will be looking at Community grievances in detail.

The surrounding community of the project is considered as an important stakeholder by the Project and addressing their grievances becomes quintessential for smooth functioning of the project. Depending on the nature and geographical setting of the project, the range of possible grievances of the community can be vast; however the following common grievances can spur in most of projects:

- Risks to community, health & safety (e.g. traffic);
- Accidents (e.g. involving livestock);
- Unethical Behavior by Renew Power personnel or its sub-contractors;
- Noise/dust/air emissions or any other impact on environment caused by project or sub-contractors;
- Demand for development interventions in the community;
- Issues owing to behavior of the security personnel and general attitude of the local community;
- Issues related to cultural conflicts or opportunity conflict owing to presence of migrant workers in the community or in the nearby areas;
- Any attempts to conceal the above.

Land Related Grievances

Land and compensation related issues include:

- Damage to, crops, infrastructure;
- Eligibility issues and payment of compensation;
- Compensation and employment entitlement against losses;
- Delay in the payment of the compensation;
- Livelihood restoration issues and associated benefits;
- Adverse impacts on community, common property resources (CPR);

Stepwise Redressal Process For Community Grievances

2.1.1. Step 1: Disclosure of Grievances Management Procedures

For any project, Renew is required to ensure suitable public disclosure of its grievance handling and redressal process to its community stakeholders. The company will assign a Community Grievance Redressal officer at its respective project sites. The same along with requisite members from project team, CSR team, QHSE or any other team will address grievances arising out of the community. In case the grievances are observed to be outside the scope or purview of the project level representatives, the same would be escalated at the the corporate level to the requisite person(s) that the respective project head will deem fit.

Disclosure of grievance mechanism with contact information of members responsible for managing community grievances at the project level would be made available and displayed at strategic locations in at the respective project offices. The designated grievance officer will record grievances of community in form of village meetings, personally communicated grievances or complaints etc.

Sensitization of Community for Grievance Registration and Addressal

For the grievance mechanism to be in line with the cultural and socio- economic characteristics, based on its understanding of the ground situation in the project area, the company will strive to provide the following information to the stakeholders (primarily community and vulnerable groups like women and SC/STs) from time to time, at least some of the following:

- Information on who can raise complaints (affected communities);
- Where, when, and how community members can file complaints;
- Company personnel responsible for receiving and responding to complaints; and
- Type of response complainants can expect from the company, including timing of response (a preliminary response should be made within 48 hours of the date on which grievance was recorded);

The existence of this redressal mechanism needs to be reminded on a regular basis during project implementation in the various community meetings and different platforms like the community meetings and at the work site. This should be done in tandem with stakeholder engagement activities wherein existence of the community grievance officer is communicated to affected stakeholders. If there is a change in the assigned officer, then the same should be disclosed as soon as possible to all affected stakeholders of the project. Person from the company's grievance committee such as onsite personnel for handling and managing grievances, CSR officers, or individuals working in analogous positions, shall be responsible for publicizing the procedure through appropriate methods. The disclosure should be verbally and graphically displayed (if possible) with a written explanation in local language.

2.1.2. Step2: Receiving and keeping track of grievances

This receipt and tracking of grievances primarily involves the following stages:

- Collecting and recording grievances as they come in;
- Registering them in a central place; and
- Tracking them throughout the processing cycle to reflect their status and important details.

Grievance Receipt and Recording

The grievance officer or any other representative assigned for collecting community grievances (e.g., community liaison or field staff at the project authorized to take grievances) will write down complaints at group or individual meetings, during field visits, or at designated locations. A uniform tracking format should be maintained and reported in, from all the projects and should contain at least the following grievance related details:

- Grievance Date
- Village/ work Site
- Areas
- Name and gender of Complainant
- Details of the issue (Categorization can be done)
- Issue Related to concerned Dept.
- Present Status (Open, Closed, and Pending Status)
- Total time taken to close the grievance

Subsequently, the grievance officer will track the resolution status, coordinate it with the personnel responsible for corrective actions, and maintain a record of progress (e.g. open, pending or closed).

The grievance officer after consultation with the requisite personnel who are required for the addressal of the grievance will give a response within maximum fifteen (15) working days of the grievance being recorded. If the aggrieved is not satisfied with the resolution measure then process of escalation of grievance to senior team members such as project head will be followed. In case the project head deems the grievance to be required to be escalated at the corporate level, the same shall forward the grievance to the relevant individual at the corporate level who he deems fit to address that particular grievance. The records of all the grievances will be consolidated and maintained for further reference. Kindly refer to the template of grievance register provided at the end of this document.

A few key expectations from the project grievance officer or any other member handling community grievances should be communicated to them are as follows:

- All incoming grievances are to be acknowledged immediately at the time of grievance being recorded. In case of grievance being heard in village meetings, it should be recorded after the meeting and assented by the aggrieved in form of signatures of individuals or representative of a group.. The community, in case willing, is also asked to put up their grievances in the community meeting register, which are taken up in the subsequent meetings. However, the option of directly communicating with the liaising in charge is also provided.
- If a more complex investigation is required, the complainant shall receive an update explaining the actions required to resolve the complaint, and the likely timeline which is additional 6 or 12 working days on the 15 days' timeline depending on the level and sensitivity of the grievance.
- The company should make every effort to ensure that all grievances are addressed satisfactorily. Again, once the matters are closed they should be signed off by the person who submitted the grievance.
- However, at any point in time, the external party may bring his grievance to the appropriate local court if he/she is not satisfied with the Company's grievance process.

2.1.3. Step3: Reviewing and Investigating Grievances

The requisite personnel from project team/QHSE/CSR/Land teams will be responsible for grievance handling will organize the process to validate the complaint's legitimacy and arrange for investigation of details. To begin this process, the nature of the grievance shall be established to determine the measures needed for review and investigation. All grievances shall undergo some degree of review and investigation, depending on the type of grievance and clarity of circumstances:

- Minor, straightforward issues may only need screening before proceeding to the next step (resolution options and response). Review of minor issues, especially those related to a complainant's request for information, can generally be handled easily by providing information on the spot through liaising in-charge.
- Less clear, more problematic, or repetitive issues, or group complaints may need a more detailed review prior to action. Staff involved in handling grievances may need to seek advice internally, and in some cases turn to outside parties to help in the validation process, especially in cases of damage claims.
- Complex issues with multiple parties may need investigation which can be organized internally, or the company may designate third-party experts to investigate when impartiality. If an extensive investigation is found to be necessary, it shall be initiated swiftly before circumstances change or the conflict escalates further.

2.1.4. Step4: Developing Resolution options and preparing a response

Rationale for Grievance Closure

The requirement/need specified in the form of grievance by the aggrieved has been effectively addressed to the satisfaction of the complainant.

Grievance should be duly addressed and closed by Renew and if possible signed off by the complainant. The closure date of the grievance needs to be recorded and communicated to the aggrieved/complainant with acknowledgement received from the complainant. This may be in form of minutes of meeting with an aggrieved group signed off by its designated head or a written signature/thumb-print of an individual/ written email etc.

Process of the Grievance Redressal

- The person having grievance will register his/her/their grievances either by approaching the site/project office during office hours of 9:00 AM to 6:00 PM on working days or raise the grievance during any village meeting or labor meeting to the project grievance representative;
- The grievance will be reported and discussed by the grievance officer with relevant project level personnel who are in position and authority to resolve that issue. In case it is addressed, the the same would be processed and closed within the project level;
- In case it is outside the purview of the project level representatives, the same would be communicated at the corporate level to the respective corporate level personal;
- The aggrieved will be heard again by an officer appointed by the assigned corporate level community grievance representative;
- The redressal measures reached for the grievance would be communicated back to the respective project level grievance officer and the same would be forwarded to the aggrieved member within the stipulated time of fifteen (15) days;

2.1.5. Step5: Monitoring, Reporting and Evaluating a Grievance Mechanism

Monitoring and reporting can be tools for measuring the effectiveness of the grievance mechanism and the efficient use of resources, and for determining broad trends and recurring problems so they can be resolved proactively before they become points of contention. Monitoring helps identify common or recurrent claims that may require structural solutions or a policy change, and it enables the company to capture any lessons learned in addressing grievances.

Monitoring Indicators

As part of its monitoring process for community grievances, some of the monitoring indicators identified that can be a part of the monitoring mechanism may include:

- Tracking the number of community grievances received and resolved by project;
- In addition to processing grievances, recognize patterns in the grievances and develop solutions, so as to minimize them and share the solutions across projects
- Circulating good practices and effective grievance redressals at the project level across to the respective community groups;
- Identify the Communities' preference to any of the several channels to submit grievances and refine the modes of grievance registering with them;
- Average time taken for resolution of grievances falling under particular category;
- Effectiveness of different solutions in addressing various category of grievances;

- Whether there are matters significantly affecting company policy or requiring legal review;
- Issues of cultural appropriateness and transparency; and
- Whether the existing system meets requirements established by the company as well as the expectations of all stakeholders.

2.1.6. Step6: Reporting and Recording

Based on all grievances received, registered, documented and tracked through database, periodic reports shall be prepared for reporting to the ESMS committee at the project level. This shall assist in tracking overall trends and patterns in community concerns allowing emerging issues to be flagged and understood at an early stage. The statistics on grievance handling and redressal are to be included in action plans and annual reporting. Monitoring and reporting also create a base level of information that can be used by the company to report back to communities.

Manpower and Financial

As already mentioned the company will assign a community grievance officer at its different project sites. The same along with requisite persons from the project team, QHSE team, CSR team etc. as per requirement will be part of the redressal mechanism who will deliberate on the grievance registered. . In case the grievances are escalated at the corporate level, RPVPL will assign required representative who would be technically qualified to look into the grievance and address the same. The corporate grievance representative may also draw additional members at the corporate level from teams such as QHSE, HR, Land, CSR etc. for addressal of that grievance as per requirement and availability.

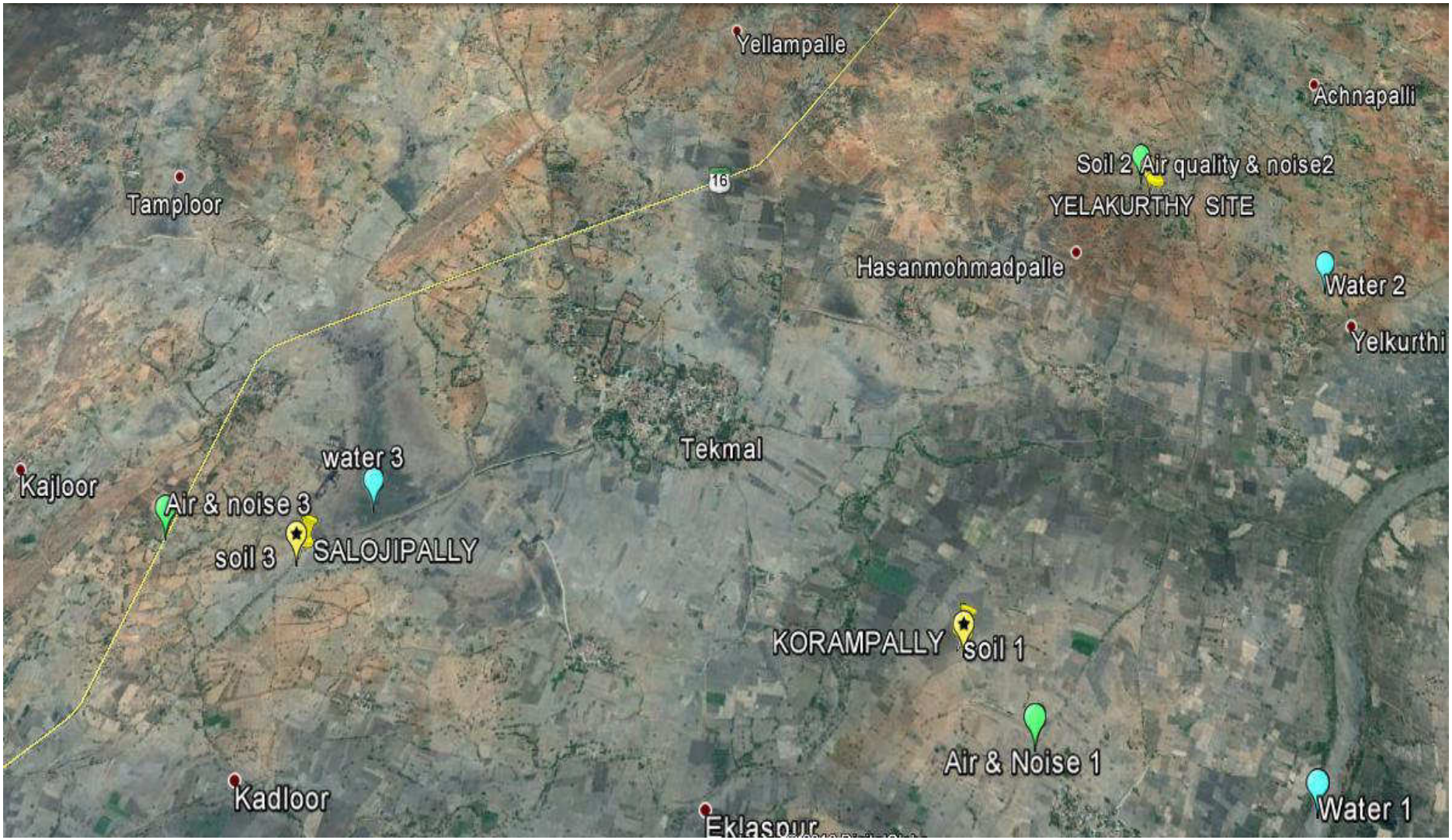
Renew will ensure a budget allocation to ensure effective function of the GRM.

Training and Capacity Building

Training to be provided especially to personnel who are in direct engagement with the communities and related stakeholders and shall include information at a minimum on:

- Expected behaviors and accepted practices when interacting with community stakeholder groups in order to avoid a grievance in the first instance;
- Routes available for community stakeholders to lodge a grievances;
- Roles and responsibilities for handling and resolving grievances (including key internal and external stakeholder contacts), and;
- Recording and tracking procedures.

APPENDIX M: MONITORING LOCATIONS



Sample Monitoring Photographs at the Project Site

Air Quality Monitoring at Korampally

Ground water sampling at Korampally

Noise Monitorring at Korampally

Soil Sampling at Korampally

Ground water Monitoring at Yellakurthy

Noise Monitoring at Yellakurthy

Soil testing at Yellakurthy

Noise Monitoring at Salojipally

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