EASTERN POWER DISTRIBUTION COMPANY OF A.P. LTD

CONVERSION OF EXISTING OVERHEAD POWER DISTRIBUTION NETWORK TO UNDER GROUND CABLING SYSTEM OF VISAKHAPATNAM CITY UNDER ANDHRA PRADESH DISASTER RECOVERY PROJECT (APDRP)

Environmental & Social Impact Assessment (ESIA) Report for Package-I

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Submitted by

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SECTION 1
INTRODUCTION

1.1 BACKGROUND

Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL) is the designated project implementing unit (PIU) for implementation of the Resilient Electrical Network or Underground Cabling component under the Andhra Pradesh Disaster Recovery Project (APDRP) under funding assistance of the World Bank. The Resilient Electrical Network(REN) or Underground cabling project is one of the six components under APDRP and constitutes conversion of all existing 33kV, 11 kV and 415 volts overhead (OH) lines into underground cable network within the municipal limits of Visakhapatam city. The REN or UG cabling project has been divided into six packages for operational requirements. (Ref **Figure1**).

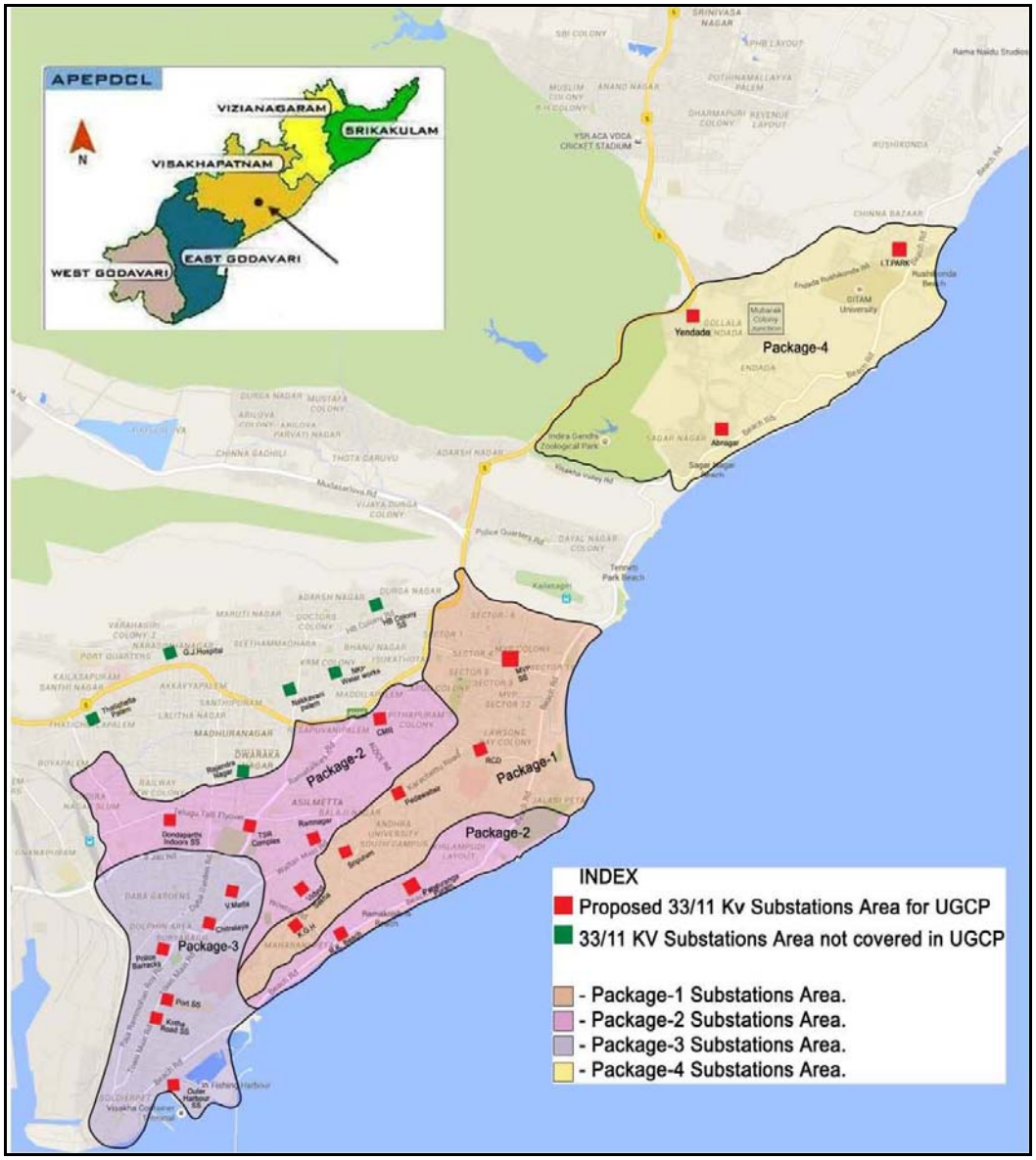

Figure 1: REN/UG Cabling Project spread within Visakhapatnam

APEPDCL is responsible for managing sub-transmission, distribution and bulk supply of power in the Operation Circles of Srikakulam, Visakhapatnam, Vizianagaram, East and West Godavari districts and 20 Operation Divisions of Coastal Andhra Pradesh. APEPDCL supplies power to over 5.107 million consumers of different categories through a network consisting of 656 Sub-stations of 33/11 KV level, 2704 feeders of 11 KV level and more than 151,447 distribution transformers of different levels.

APEPDCL had appointed M/s Power Finance Corporation(PFC) Consulting Limited, New Delhi for the preparation of Detailed Project Report (DPR), in order to study the existing OH system and prepare DPR for replacement of existing OH system (2015) with Under Ground cables in entire Visakhapatnam city area (in 6 packages), duly carrying out the load flow studies of existing OH system (2015), existing OH system with load condition of year 2022 and proposed UG system with load condition of year 2022.

1.2 ABOUT REQUIREMENT OF ESIA

APEPDCL desires to conduct an Environmental and Social Impact Assessment (ESIA) of the REN/UG cabling project, covering all six packages spread across Visakhapatnam city municipal limits (GVMC area).

The ESIA studies are to be aimed at effective assessment of the likely environmental and social impacts and their management through efficient and appropriate management measures, in order to protect or enhance the quality of the environment and social settings within the UG project influence area and also facilitate implementation of REN/UG cabling project in an environmentally and socially sustainable manner.

The ESIA studies are also required to ensure the implementation of REN/UG cabling project is in consonance with the environmental and social management framework under APDRP as well as in compliance with the environmental and social safeguards requirements of the World Bank.

1.3 OBJECTIVES OF ESIA

APEPDCL has set out the objectives of the ESIA studies as hereunder:

- To conduct an Environmental and Social Impact Assessment (ESIA) of each package of the REN/UG cabling project by collecting required data, conducting necessary field investigations and primary surveys and assessing environmental, social, health and safety impacts of each package
- To recommend suitable mitigation measures; both for Environmental and Social impacts based on the detailed ESIA.
- To identify and recommend suitable measures for the disposal of various unserviceable materials generated due to the project such as electrical cables, transformers, electric poles, soil and other waste or recyclable/reusable materials.

- To submit compliance report after completion of REN/UG cabling works of each of the packages.

1.4 SCOPE OF ESIA

The Scope of the ESIA studies includes:

- Preparation of Transect Walk strip plans (based on strip plans provided by APEPDCL) with all features along the alignment to be marked on these plans.
- Taking Videograph of entire UG cabling alignment.
- Develop a detailed strip plan of the proposed underground cable alignment providing various features that are located along alignment and its immediate vicinity, at least double the width of the trench
- Preparation of environmental and socio-economical profile of the project (corridor of impact), through primary and secondary information (comprising demographic, socio-economic, physical, biological and ecological environmental features, etc).
- Conduct a socio-economic survey of the households along the alignment duly covering all indicators for the present and future evaluation and assessment.
- Preparation of a questionnaire or instruments for the ESIA study and share the same with World Bank for review.
- Based on the strip plan and field visits, develop an inventory of impacts of both temporary and permanent structures, trees and other environmental sensitive receptors such as schools, religious places and other common property resources and any other issues, which may be affected, while laying the underground cable network and during operation and maintenance.
- Identification of various other issues such as disposal of excess excavated earth, waste, disposal/ reuse of old over head electric cables, dismantling/ disposal of electrical poles, disposal of excess transformers (if any), disposal of transformer oil (if any), etc.
- Assessment of the health and safety impacts of laying the underground cable network, both during construction and operation phase of the project.
- For all the impacts/ issues identified above, recommend elimination or mitigation/ management measures to be implemented by the project agencies and the construction contractors, in line with the Environmental and Social Management Frame work (ESMF) of APDRP.
- Study & inclusion of measures and plans mitigating temporary/ permanent impacts to the structures and communities along the cable alignment and prepare site specific EMP to mitigate environmental impacts, RAP (if there are resettlement/ rehabilitation issues) and/or SMP for mitigating social impacts and community engagement.
- Identify various regulatory clearances that may be required for the project, such as CRZ, clearances, tree cutting/lopping permissions, “No objections” from state / national agencies, utility agencies, etc.

- Preparation of a Monitoring Plan with reference to ESIA
- A Grievance Redressal mechanism is to be developed in accordance with the ESMF under APDRP and as per World Bank guidelines
- Conduct formal stakeholder public consultations (minimum of three), to understand the impacts anticipated by the communities and also to explain measures proposed under project to implement to mitigate such impacts. These Public Consultations are to be conducted with the communities for information dissemination and their feedback. At least one such consultation with women in each community. The World Bank and the APEPDCL need to be informed before conducting these consultations for possible participation.
- Finalize EMP and RAP/ SMP for implementation, after review and up-dation of comments from APEPDCL and the World Bank

1.5 CONSULTANT'S APPOINTMENT AND MOBILIZATION

APEPDCL appointed M/s Deccan Consulting Engineers Private Limited(Consultants) in order to carryout ESIA studies of the proposed REN/UG cabling project in accordance with the set out scope of work and Terms of Reference issued as part of RFP (ref **Annexure 1**).

The agreement between APEPDCL and Consultants was signed on 19th December 2015 and consultant's mobilized their team with effect from 22nd December 2015 and initiated activities in accordance with the set out scope of work for ESIA studies. The consultant's team constituted key experts; HARI PRAKASH, Environmental Expert and DINESH GODIYAL, Social Expert. The key experts will be supported by other junior professionals (non-key experts) and field personnel as indicated in the proposal on required basis.

Upon mobilization, key experts of consultants held a start up meeting chaired by Chief General Manager (projects), Divisional Engineer (DE), Additional Divisional Engineer (ADE and Assistant Engineer (AE) along with other with concerned officials of APEPDCL.

During the meeting, the consultants were briefed by PIU officials about the REN/UG cabling project, status of project preparation activities and package wise DPRs prepared and submitted by PFC for REN/UG cabling project along with and APEPDCL's intended work program for an early implementation of this underground cabling project and therefore the requirement of completion of the ESIA in timely manner.

1.6 DATA/DOCUMENTS REVIEW BY CONSULTANTS

Subsequent to start up meeting, APEPDCL provided the following data/documents as available with PIU, APEPDCL for consultant's review and understanding of the envisaged project.

- DPR for Package-1: 33/11kV Substations at MVP Colony, Pedawaltair, KGH, LB Colony and Siripuram) prepared by PFC and submitted in November 2015

- DPR drawings showing proposed cable routing for all 33/11KV lines under each of the 5 sub-stations within Package 1

- Environmental and Social Management Framework for the Andhra Pradesh Disaster Recovery Project(APDRP)

1.7 CONSTRAINTS OF DATA BASE

The consultant's have the following observations on the DPR and Drawings of Package 1: 33/11kV Substations at MVP Colony, Pedawaltair, KGH, LB Colony and Siripuram)

- The alignment of cable routes indicated in the DPR are deemed to have been finalized after due consideration of several factors like most optimal length, analysis of alternatives, minimum obstacles among other influencing factors. Therefore, UG cable routes as proposed in the DPR drawings is considered as final for assessment of the likely environmental and social impacts. This is also evident from the fact that scope of work for preparation of DPR includes consideration of all such factors for finalization of cable alignment (ref Page 19/Section 3- Scope, Approach and Methodology of DPR for Package 1 submitted by PFC)

- DPR does not provide information of the underground utilities along as well as across the proposed UG cabling routes. Understandably, no Ground Penetrating Radar(GPR) surveys have been conducted under this component of APDRP, which could have otherwise provided information about the pre-existing underground utilities along and across the proposed cable routes

- The GIS maps does show only the road and proposed cable alignments and does not contain information like foot paths, drains, obstacles, private/public properties and other structures like roadside shops, temples, trees, which are likely to be impacted etc. although this forms one of the obligations of APEPDCL to Consultants under this assignment

- APEPDCL has informed that it has no other information about the existing underground utilities along or across the proposed UG cabling routes

1.8 STRUCTURE OF ESIA REPORT

The ESIA report has been structured into **10 Sections** as hereunder

Section 2 - Environmental and Social Regulatory Framework: This section summarizes the applicable Environmental and Social Policies and Regulatory Framework, which are applicable to the REN/UG cable project.

Section 3 - Project Description: This section summarizes the project designs and proposed configurations for laying of underground cables under the resilient electrical network component of APDRP.

Section 4- Baseline Environment Profile: This section summarizes the baseline environmental profile of the Visakhapatnam city, within which the REN/UG cable project will be implemented under different packages. The baseline environmental conditions of Visakhapatnam city has been profiled based on both secondary data base as well as primary assessments.

Section 5- Baseline Socio-Economic Profile: This section summarizes the baseline environmental profile of the Visakhapatnam city, within which the REN/UG cable project will be implemented based on both secondary data base as well as primary assessments. The socio economic profile of street hawkers/vendors/squatters (both ambulatory and stationery), presently operating within the operational or corridor of impact area of 2 metre wide for laying of the REN/UG cable route have also been captured through census survey, through a specially structured questionnaire. The public perception/view points captured through public consultations and/or focus group discussions have also been summarized under this section.

Section 6- Environmental Impacts: This section summarizes the anticipated environmental impacts due to the proposed REN/UG cable project. The section also includes suggested management measures in order to avoid or to mitigate the likely impacts during pre-construction, construction and operation phases.

Section 7- Social Impacts: This section summarizes the anticipated social impacts due to the proposed REN/UG cable project. The section also includes suggested management measures in order to avoid or to mitigate the likely impacts during pre-construction, construction and operation phases.

Section 8- Analysis of Alternatives: This section summarizes the alternatives considered in the project design in order to minimize and/or avoid the potential environmental as well as social impacts due the REN/UG cable project.

Section 9- Environmental and Social Management Plan: This section summarizes an Environmental and Social Management Plan (ESMP) in order to minimize and/or avoid the impacts of the REN/UG cable project. The section also includes the roles and responsibilities for both PIU (APEPDCL) and contractor(s) for managing the anticipated impacts. Budgetary provisions along with institutional arrangements required for implementing the ESMP and monitoring mechanism during project implementation phase is also included in this section in accordance with ESMF of APDRP. A grievance redress mechanism has also been included in this section.

Section 10- Grievance Redress Mechanism: This section summarizes a robust and responsive grievance redress mechanism, given the nature of this project component and its potential to disrupt public utilities, water, sanitary utilities, impact upon street vendors/squatters among others and trigger public resentment, despite the benefits, that the project can usher on society.

2.1 APPLICABLE ENVIRONMENTAL REGULATIONS

This section presents existing environmental policies, legislations and regulatory frame work relevant to the project at the National and State level. The various statutory clearances from various state and central government authorities are also included in this section.

2.1.1 Legal Framework

The Government of India has laid out various policy guidelines, acts and regulations pertaining to environment. The Environment (Protection) Act, 1986 provides umbrella legislation for the protection of environment. As per this Act, the responsibility to administer the legislation has been jointly entrusted to the Ministry of Environment and Forests (MoEF) and the Central Pollution Control Board (CPCB)/Andhra Pradesh State Pollution Control Board (APSPCB) in the present context. More details on the legal framework of Government of India and State Government regulations and clearance procedures are envisaged in the following paragraphs.

2.1.2 Key Environmental Laws and Regulations

Table 2.1 presents the environmental regulations and legislations relevant to AP state road project.

Table 2.1: Environmental Regulations and Legislations

SR. No	Act / Rules	Purpose	Applicable Yes/ No	Reason for Applicability	Authority
1	Environment Protection Act-1986	To protect and improve overall environment	Yes	As all environmental notifications, rules and schedules are issued under this act.	MoEF. GoI; DoE, State Gov. CPCB; SPCB
2	Environmental Impact Assessment Notification 14th Sep-2006	To provide environmental clearance to new development activities following environmental impact assessment	NO	This notification is NOT applicable as REN/UG cabling Project is outside the purview of the notification	MoEF. SEIAA
3	Notification for use of fly ash	Reuse large quantity of fly ash discharged from thermal power plant to minimize land use for disposal	NO	Normally, this notification is applicable for projects under the purview of EIA notification, 2006 and within a distance of 100 kms.	MoEF/SPCB
4	Coastal Regulation Zone(CRZ) Notification 1991 (2002)	Protection of **fragile coastal** belt	YES	REN/UG cabling routes come under CRZ II areas, where construction activities (buildings) are permitted. However, UG cable routes are away from HTL and along existing city roads	CRZMA

SR. No	Act / Rules	Purpose	Applicable Yes/ No	Reason for Applicability	Authority
5	National Environment Appellate Authority Act (NEAA) 1997	Address Grievances regarding the process of environmental clearance.	Yes	Grievances if any will be dealt with, within this act.	NEAA
6	The Land Acquisition Act 1894 & 1989	Set out rule for acquisition. of land by government	NO	No land acquisition is required for the REN/UG cabling project.	District Administration /Revenue Department State Government.
7	MoEF Circular on Marginal Land Acquisition and Bypasses 1999	Defining “marginal land’ acquisition relating to the 1997 Notification	NO	Not applicable as per Environmental Impact Assessment Notification 14th Sep-2006	MoEF
8	The Forest (Conservation) Act 1927 The Forest (Conservation) Act. 1980 forest (conversion) Rules 1981	To check deforestation by restricting conversion of forested areas into non- forested areas	NO	REN/UG cabling routes does not pass through forest areas or require diversion of forest areas for non-forest purposes	Forest Department, GoAP
9	MoEF circular (1998) on linear Plantation on roadside, canals and railway lines modifying the applicability of provisions of forest (Conversation) Act, to linear Plantation	Protection / planting roadside strip as avenue/strip plantations as these are declared protected forest areas.	NO	REN/UG project will not involve roadside tree felling	MoEF
10	Wild Life Protection Act 1972	To protect wildlife through certain of National Parks and Sanctuaries	NO	This act is not applicable to as there are NO points of wildlife crossing along REN/UG cable routes	Chief Conservator Wildlife, Wildlife Wing, Forest Department, GoAP
11	Air (Prevention and Control of Pollution) Act, 1981	To control air pollution by & Transport controlling emission of air Department. Pollutants as per the prescribed standards.	Yes	This act will be applicable during construction; for obtaining NOC for establishment of hot mix plant, workers' camp, construction camp, etc.	SPCB

SR. No	Act / Rules	Purpose	Applicable Yes/ No	Reason for Applicability	Authority
12	Water Prevention and Control of Pollution) Act,1974	To control water pollution by controlling discharge of pollutants as per the prescribed standards	Yes	This act will be applicable during construction for (establishments of hot mix plant, construction camp, workers' camp, etc.	SPCB
13	Noise Pollution (Regulation and Control Act),1990	The standards for noise for day and night have been promulgated by the MoEF for various land uses.	Yes	This act will be applicable for all vehicles deployed for implementation of REN/UG Project	SPCB
14	Ancient Monuments and Archaeological Sites and Remains Act,1958	Conservation of cultural and historical remains found in India	NO	This act not applicable as the project route is not close to any Ancient Monument, declared protected under the act.	Archaeological Dept GoI, Indian Heritage Society and Indian National Trust for Art and Culture Heritage (INTACH).
15	Public Liability and Insurance Act 1991	Protection form hazardous materials and accidents.	Yes	Contractor need to stock hazardous material like diesel, Bitumen, Emulsions etc.	SPCB
16	Explosive Act 1984	Safe transportation, storage and **use of explosive** material	Yes	For transporting and storing diesel, bitumen etc.	Chief Controller of Explosives
17	Minor Mineral and concession Rules	For opening new quarry.	Yes	Regulate use of minor minerals like stone, soil, river sand etc.	District Collector
18	Central Motor Vehicle Act 1988 and Central Motor Vehicle Rules1989	To check vehicular air and noise pollution.	Yes	This rule will be applicable to road users and construction Machinery.	Motor Vehicle Department
19	National Forest Policy1952 National Forest Policy(Revised) 1988	To maintain ecological stability through preservation and restoration of biological diversity.	NO	This policy will not be applicable as NO eco sensitive feature exists along REN/UG cable route/corridor.	Forest Department, GoI and GoAP
20	The Mining Act	The mining act has been notified for safe and sound mining activity.	Yes	The REN/UG cabling project will require aggregates. These will be procured from open market or through project specific mining from riverbeds and quarries	Department of mining, GoAP

2.1.3 Environmental Requirements of the State

In case of tree felling and transportation of Trees, permissions are to be taken from forest department at DFO level, under A.P. WALTA Act 2002.

Andhra Pradesh Water, Land Trees Act, (WALTA) 2002

The Act came into force on April 19, 2002 with an objective **"to promote water conservation, and tree cover and regulate the exploitation and use of ground and surface water for protection and conservation of water sources, land and environment and matters, connected therewith or incidental thereto**".

SR. No	Act / Rules	Purpose	Applicable Yes/ No	Reason for Applicability	Authority
1	WALTA Act 2002	To promote water conservation, and tree cover	No	No tree felling/cutting is envisaged under the REN/UG cabling project	Forest Department.

2.1.4 Other Legislation Applicable to Road Construction Projects

Environmental issues during any project construction generally involve equity, safety and public health issues. The road construction agencies require complying with laws of the land, which include inter alia, the following:

- **Workmen's Compensation Act 1923** (the Act provides for compensation in case of injury by accident arising out of and during the course of employment);
- **Payment of Gratuity Act, 1972** (gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years);
- **Employees PF and Miscellaneous Provision Act 1952** (the Act provides for monthly contributions by the employer plus workers);
- **Maternity Benefit Act, 1951** (the Act provides for leave and some other benefits to women employees in case of confinement or miscarriage, etc.);
- **Contact Labor (Regulation and Abolition) Act, 1970** (the Act provides for certain welfare measures to be provided by the contractor to contract labour);
- **Minimum Wages Act, 1948** (the employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government);
- **Payment of Wages Act, 1936** (it lays down as to by what date the wages are to be paid, when it will' be paid and what deductions can be made from the wages of the workers);
- **Equal Remuneration Act, 1979** (the Act provides for payment of equal wages for work of equal nature to Male and Female workers and not for making discrimination against Female employees);
- **Payment of Bonus Act, 1965** (the Act provides for payments of annual bonus subject to a minimum of 83.3% of wages and maximum of 20% of wages);

- **Industrial Disputes Act, 1947** (the Act lays down the machinery and procedure for resolution of industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment);
- **Industrial Employment (Standing Orders) Act; 1946** (the Act provides for laying down rules governing the conditions of employment);
- **Trade Unions Act, 1926** (the Act lays down the procedure for registration of trade unions of workers and employers. The trade unions registered under the Act have been given certain immunities from civil and criminal liabilities);
- **Child Labour (Prohibition and Regulation) A; 1986** (the Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes. Employment of child labour is prohibited in Building and Construction Industry);
- **Inter-State Migrant Workmen's (Regulation of Employment and Conditions of Service) Act, 1979** (the inter-state migrant workers, in an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, traveling expenses from home to the establishment and back, etc.);
- **The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996** and **the Cess Act of 1996** (all the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act; the employer of the establishment is required to provide safety measures at the building or construction work and other welfare measures, such as canteens, first-aid facilities, ambulance, housing accommodation for Workers near the workplace, etc.);
- **The Factories Act, 1948** (the Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours and rendering information-regarding accidents or dangerous occurrences to designated authorities);
- **Hazardous Wastes (Management and Handling) Rules, 1989;**
- **Chemical Accidents (Emergency Planning, Preparedness and Response) Rules, 1996**.

2.1.5 World Bank Environmental Requirements

The various environmental requirements of World Bank, GoI for the project roads are described below.

(i) Applicability of various WB safe guard Policies

The World Bank has ten safeguard policies; the details and applicability of the safe guard policies to the REN/UG cabling project is provided in the **Table 2.2**.

Environmental requirements of the World Bank are specified in detail in its Operational Policy (OP) 4.01 and other related Operation Policies. In instances in which the procedural and regulatory requirements differ, the more stringent applies. The World Bank environmental requirements are based on a three-part classification system.

- **Category A** - requires a full Environmental Assessment (EA).
- **Category B** - projects require a lesser level of environmental investigation.
- **Category C** - projects require no environmental analysis.

The environmental and social management framework for the APDRP, has categorized the In view of the potential impacts on the environment, Bank's OP 4.01 on Environmental Assessment, OP 4.04 on Natural Habitats, OP 4.36 on Forests, OP 4.09 on Pest Management and OP 4.11 on Physical Cultural Resources have been triggered, and the project is designated as Category A. On the whole, with proper planning/design and implementation of management measures, any large scale, significant and/or irreversible damage to natural and/or physical environment can be avoided/ minimized and managed. Therefore, an appropriate combination of avoiding and minimizing negative impacts on one hand and tapping on opportunities to enhance and increase positive impacts on the other, will remain central to environmental management and safeguards for the project. On the basis of data and information collected during field survey and discussion with local expert and visualise potential associated impact, consultant has categorised this project as **category-B**, which requires a lesser level of environmental investigation.

Table 2.2: Applicability of WB Safe Guard Policies

S.No	WB Safe Guard Policy	Subject Category	Triggered Or Not	Reason For Its Applicability	Mitigation Measures	Documentation
1	OP 4.01	Environmental Assessment	Triggered	Umbrella policy	All necessary mitigation measures to be incorporated.	EIA & EMP.
2	OP 4.04	Natural Habitats	Not Triggered	Eco-sensitive-Forestry and wildlife related issues	Not Applicable	Not Applicable
3	OP 4.36	Forestry	Not Triggered	No forest land.	Not Applicable	Not Applicable
4	OP 4.09	Pest Management	Not Triggered	Not Applicable	Not Applicable	Not Applicable
5	OP 4.30	Involuntary Resettlement	Triggered	REN/UG cabling project will lead to temporary loss of income/livelihoods, but there will be no loss of land and buildings	Applicable	RAP
6	OP 4.20	Indigenous people	Not Triggered	No separate Indigenous people development Plan is required for the Project.	Not Applicable	Not Applicable
7	OP 4.11 (draft)	Cultural Property	Not Triggered	A number of temples, shrines, churches etc are located adjacent to REN/UG cabling route But NO declared / protected cultural property exists.	Not Applicable	Not Applicable

2.1.6 Summary of Clearance Requirements

The summary table showing time requirements for agency responsible for obtaining clearance, and a stage at which clearance will be required is given below:

Sl. No.	Type of Clearance	Applicability	Project Stage	Responsibility	Time Required
1	Environmental Clearance from MoEF/SIAA	Not Applicable	Not Applicable	Not Applicable	Not Applicable
2	Forest Clearance for land diversion	Not Applicable	Not Applicable	Not Applicable	Not Applicable
3	Tree felling permission	Not Applicable	Not Applicable	Not Applicable	Not Applicable
4	NOC and consents under Air, Water & Environment Act and noise rules from SPCB	For establishment of construction camp/crusher units.	Construction stage (Prior to initiation of any work)	Contractor	1 Month
5	NOC and consents under Air, Water & Environment Act and noise rules from SPCB	For operating construction plant, crusher, batching plant etc.	Construction stage (Prior to initiation of any work	Contractor	1 Month
6	Explosive License from Chief Controller of Explosives,	For storing fuel oil, lubricants, diesel etc. at construction camp	Construction stage (Prior to initiation of any work)	Contractor	2-3 Months
7	Permission for storage of hazardous chemical from CPCB	Manufacture storage and Import of Hazardous Chemical	Construction stage (Prior to initiation of any work)	Contractor	2-3 Months
8	Quarry Lease Deed and Quarry License from State Department of Mines and Geology	Quarry operation (for new quarry)	Construction stage (Prior to initiation of any work)	Contractor	2-3 Months
9	Permission for extraction of ground water for use in REN/UG cable	Extraction of ground water	Construction stage (Prior to initiation of any work)	Contractor	2-3 Months

2.2 APPLICABLE SOCIAL REGULATORY FRAMEWORK

2.2.1 General

The REN/UG cable Project is one of the several project components under APDRP and APDRP has a comprehensive ESMF to address the land acquisition, resettlement and Rehabilitation issues for PAPs under APDRP. The relevant/applicable ESMF provisions, which also includes the entitlements for eligible affected families as applicable for REN/UG cable project has been extracted and presented under this section. The ESMF under APDRP itself has been developed based on the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act 2013, Government of India and World Bank's Operation Policies for Social Safeguards.

2.2.2 The Right to Fair Compensation and Transparency in Land Acquisition and Rehabilitation and Resettlement Act 2013

- The RFCTLARR, 2013 is an umbrella Act, which has been enacted to address the aspects on both land acquisition and resettlement and rehabilitation of the project affected population. This Act supersede all the previous act of Land Acquisition (LA) of 1894 amended in 1985 and National Rehabilitation and Resettlement Policy, 2007 and is applicable to the whole of India except the state of Jammu and Kashmir. The key provisions of this Act relating to land acquisition, compensation, rehabilitation and resettlement, briefed below:
- Government acquires land for its own use, hold and control, including land for Public sector undertakings.
- Government acquires land with the ultimate purpose to transfer it for the use of private companies for stated public purpose.
- Government acquires land for Public Private Partnership Projects.
- Schedule I outlines the proposed minimum compensation based on a multiple of market value.
- Schedule II through VI outlines the resettlement and rehabilitation entitlements to land owners and livelihood losers, which shall be in addition to the minimum compensation as per Schedule I.
- Below elaborates some important provisions:
- Section 16 of the Act briefs on the preparation of RAP, publication and public hearing of RAP. Upon the publication of the preliminary notification by the collector, the Administrator for Rehabilitation and Resettlement shall conduct a survey and undertake a census of the affected families.
- A draft Rehabilitation and Resettlement Scheme shall be prepared by the Administrator which shall include particulars of the R&R entitlements of PAPs. The draft shall include time limit for implementing the Scheme. The Scheme shall be discussed in the concerned Gram Sabha or Municipalities.
- A public hearing shall be conducted after adequate publicity about the date, time and venue in the affected area. Following the public hearing, the Administrator shall submit the draft Scheme along with a specific report on the claims and objections raised in the public hearing to the Collector.

- As per Section 25, the Collector shall make an award within a period of twelve months from the date of publication of the declaration and if no award is made within that period the entire proceedings for the acquisition of the land shall lapse, provided that the appropriate Government shall have the power to extend the period in circumstances justifying the same and any such decision to extend the period shall be recorded in writing and be notified and uploaded on the website of the authority concerned.
- Section 25, 29 and 30 of the Act briefs on the methodology of determining the market value of the land and other properties.
- After determining the total compensation to be paid, a “Solatium” as prescribed in the Act shall be added to the compensation.
- The new Act emphasizes elaborate social assessment and resettlement planning even prior to issuance of the preliminary notification and proposes to provide a range of R&R benefits along with the compensation package. Some of the highlights are as follows:
- Offers compensations up to 4 times the market value in rural areas and 2 times the market value in urban areas.
- The Act applies retrospectively to cases where land acquisition award has not been made.
- LA in Scheduled Areas will require consent of the local general assembly (Gram Sabhas).
- No displacement or dispossession until full payment of compensation and RR benefits are made and alternative sites for the resettlement and rehabilitation have been prepared.
- Bill requires the consent of no less than 70 per cent and 80 per cent respectively (in both cases) of those whose land is sought to be acquired in case of PPP or private projects.
- To safeguard food security and to prevent arbitrary acquisition, the Bill directs States to impose limits on the area under agricultural cultivation that can be acquired.
- In case land remains unutilized after acquisition, the new Bill empowers states to return the land either to the owner or to the State Land Bank.
- No income tax shall be levied and no stamp duty shall be charged on any amount that accrues to an individual as a result of the provisions of the new law.
- Where acquired land is sold to a third party for a higher price than 40 per cent of the appreciated land value (or profit) will be shared with the original owners.
- In every project those losing land and belonging to the SC or ST will be provided land equivalent to land acquired or two and a one-half acres, whichever is lower (this is higher than in the case of non-SC/ST affected families) -Where the affected families belonging to the SC and the ST are relocated outside of the district then they shall be paid an additional 25% rehabilitation and resettlement benefits to which they are entitled in monetary terms along with a one-time entitlement of 50000 rupees.

2.2.2.1 Minimum R&R Entitlements under this Act

The following are the minimum R&R entitlements under this Act:

i. Subsistence allowance at Rs. 3000 per month per family for 12 months;

ii. The affected families shall be entitled to: (a) Where jobs are created through the project, mandatory employment for one member per affected family or (b) Rupees 5 lakhs per family; or (c) Rupees 2000 per month per family as annuity for 20 years, with appropriate index for inflation; The option of availing (a) or (b) or (c) shall be that of the affected family

iii. If a house is lost in rural areas, a constructed house shall be provided as per the Indira Awas Yojana specifications. If a house is lost in urban areas, a constructed house shall be provided, which will be not less than 50sqmts in plinth area. In either case the equivalent cost of the house may also be provided in lieu of the house as per the preference of the project affected family;

iv. One acre of land to each family in the command area, if land is acquired for an irrigation project if possible BUT the same shall be in lieu of Compensation;

v. Rs 50,000 for transportation;

vi. A one-time Resettlement Allowance of Rs 50,000;

2.2.2.2 Special Provisions for SCs and STs

In addition to the R&R package, SC/ST families will be entitled to the following additional benefits:

i. Land to be given to each family in every project even in the case of irrigation projects;

ii. One time financial assistance of Rs. 50,000 per family;

iii. Families settled outside the district shall be entitled to an additional 25% R&R benefits;

iv. Payment of one third of the compensation amount at very outset;

v. Preference in relocation and resettlement in area in same compact block;

vi. Free land for community and social gatherings;

vii. In case of displacement, a Development Plan is to be prepared.

viii. Continuation of reservation and other Schedule V and Schedule VI area benefits from displaced area to resettlement area.

The National Act on Right to Fair Compensation and Transparency in Land Acquisition, Resettlement and Rehabilitation Act, 2013 (RFCTLAR&R Act 2013) has more synergies and largely in consistent with the provisions of the OP 4.12 and 4.10. The critical synergies and provisions in common between the two are presented below.

i. Mandatory ex-ante social assessments to determine whether an acquisition serves a public purpose;

ii. Requirements to ascertain the minimum land requirements, assess the impact of the acquisition on livelihoods, shelter, public infrastructure, and community assets;

iii. Provisions to minimize adverse impacts, assessment of cost and benefits of acquisition, enhanced land-loss compensation formulas; livelihoods support for affected persons; comprehensive resettlement and rehabilitation benefits and assistance; census of the affected families to record their socio-economic profile and potential losses, and inventory of affected public and community assets, options and choices for affected families and special provisions for disadvantaged groups; and a legal mandate that affected persons must receive compensation and assistance before their property is taken; and;

iv. Consultations and disclosure, and post-implementation audits.

At the same time, there are a few notable differences between the Act and the World Bank's policy requirements:

i. Persons who live or depend on rights-of-way or public lands excluded from the Act's benefits and entitlements;

ii. A three-year residency requirement for persons losing livelihood, to receive resettlement and rehabilitation benefits. World Bank's Ops is not specific on this but the objective and the principles of OPs broadly supports for extending the entitlements to these persons if they are notified on the date of the census survey;

iii. The valuation of assessing buildings and structures under the act remains based on depreciation method as under previous Act.

iv. Provision for Negotiated settlement is not included in the new Act. Negotiated settlement is one of the key provisions in World Banks OPs.

The Entitlement Matrix specific to REN/UG Cabling Project was developed based on the provisions of the RFCTLARR Act, 2013 and World Bank's safeguard policies as suggested in the approved ESMF. The details are given below in **Table 2.3** hereunder.

Table 2.3: Entitlement Matrix for REN/UG Cabling Project

S.No.	Impact Category	Unit of Entitlement	Details of Entitlements	Remarks
Loss of Residential and Commercial Structures - Non Titleholders				
1	Encroachers	Affected Person (Individual/Family)	(a) Assistance amount equivalent for impacted structures at replacement cost determined on the basis of R&BD Schedule of Rates as on date without deducting depreciation cost. (b) Encroachers shall be given advance notice of 2 months in which to remove assets/crops.	
2	Squatters		(a) Assistance amount equivalent for impacted structures at replacement cost determined on the basis of R&BD Schedule of Rates as on date without deducting depreciation cost. (b) All squatters will be paid subsistence allowance of Rs 30000. (c) All squatters will be paid Rs 10000	

S.No.	Impact Category	Unit of Entitlement	Details of Entitlements	Remarks
			as shifting allowance (c) Right to salvage materials from affected structure	
Loss of livelihood – Title and Non-Titleholders				
3	Loss of livelihood – title holders and commercial squatters	(Individual/Family)	One time grant of Rs 25,000 (value prescribed under RFCTLARR Act 2013) Training assistance	For commercial squatters, the eligibility will become from the date of Census survey
4	Foreseeable and unforeseen impacts* likely during the construction stage	Owner, affected person	Payment of damages if any to structures Temporary access would be provided, where necessary	Such as temporary impacts on structures, temporary disruption to access or passage, particularly in congested slums if the option of mobile units is not used
5	Temporary loss of income of mobile kiosks, if any	Kiosk owner	Two months advance notice to vacate the area	
6	SC, ST and Disabled Persons		Assistance to include in government welfare schemes if not included, if eligible as per Government criteria; and Additional benefits to SC and ST as per the provisions of RFCTLARR Act 2013 Schedule	
7	Women		• In case of extending any productive asset, joint ownership in the name of husband and wife will be offered. While disbursing the entitlements, women will be given the first priority to receive the entitlement benefits over other entitled persons.	
8	Loss of or impact on any Common or cultural Property Resource such as shrine, temple, mosque, hand pump, shed, etc.	Community, Village/ Ward	Resources such as cultural properties and community assets shall be conserved (by means of special protection, relocation, replacement, etc.) in consultation with the community.	
9	Unforeseen impacts		Any unforeseen impacts shall be documented and mitigated in accordance with the principles and objectives of the Policy	

SECTION 3
PROJECT DESCRIPTION

3.1. BACKGROUND

On October 12, 2014, a very severe cyclonic storm “Hudhud” made landfall on the coast of Andhra Pradesh, near the city of Visakhapatnam. At the time of landfall, the estimated maximum sustained surface wind speed associated with the cyclone was about 180-220 kmph and height of the waves up to 3 meters. The tide gauge at Visakhapatnam reported maximum storm surge of 1.4 meters above the astronomical tide. By October 14, “Hudhud” drifted northwards toward Uttar Pradesh and weakened into a well-marked low-pressure area over east Uttar Pradesh and neighbourhood.

The Government of Andhra Pradesh (GoAP) was proactive in preparing for cyclone “Hudhud”. In addition to the updates from India Meteorological Department (IMD), the intensity and magnitude of the cyclone were continuously tracked at Andhra Pradesh State Disaster Management Authority (APSDMA) and a range of preparatory measures were launched to face the cyclone. Relief and rescue team were deployed in the coastal districts most likely to be impacted and regular warnings to vulnerable populations were issued through various channels. This, supplemented by the evacuation of close to 250,000 persons, mostly living in vulnerable kutcha houses or low-lying areas, helped limit the death toll from the cyclone to 61.

Cyclone “Hudhud” and the floods that followed the associated heavy rainfall caused extensive devastation in all the affected districts, uprooting vast number of trees, damaging roads, public buildings, livelihoods and disrupting telecommunications and power infrastructure.

3.2. THE PROJECT- APDRP

The Andhra Pradesh Disaster Recovery Project (APDRP) constitutes a large multi- sector engagement on risk and vulnerability reduction, with assistance for restoring and improving rural connectivity, public services and livelihood opportunities in targeted communities of Andhra Pradesh, and increase the capacity of the State Entities to respond promptly and effectively to an eligible crisis or emergency. APDRP is part of a broader package to support the GoAPs reconstruction and recovery efforts and to strengthen its capacity to manage future events.

3.3. PROJECT BENEFICIARIES

The project, through its different components, will provide both direct and indirect benefits to the State of Andhra Pradesh and its 49.4 million inhabitants. Direct beneficiaries include populations of the vulnerable coastal areas, particularly the four heavily impacted districts of Srikakulam, Vizianagaram, Visakhapatnam and East Godavari with a total approximate population of 13.3 million residents.

3.4. PROJECT COMPONENTS

The APDRP has seven components:

I. Resilient electrical network/Under Ground Cabling Project;

II. Restoration of connectivity and shelter infrastructure;

III. Restoration and protection of the beach front;

IV. Restoration of environmental services and facilities and livelihood support;

V. Capacity building and technical support for disaster risk management;

VI. Project implementation support; and

VII. Contingency emergency response.

3.5. RESILIENT ELECTRICAL NETWORK/ UG CABLING PROJECT (COMPONENT 1)

The objective of this component is to reduce the vulnerability of the Visakhapatnam city's electrical network through conversion of all overhead power distribution system into underground the power distribution system through laying of underground cables. Under this component, all 33kV, 11 kV and 415 volts network lines are to be converted to underground cable network starting from consumers meter board and going to 11kV and 33 kV feeders, from the beach road and going towards landside. The component will also include provision for high-speed data/voice transmission cables in the city of Visakhapatnam. Conversion of the existing over head distribution network i.e., LT upward to 33kV into underground cabling has been contemplated as a remedy to overcome cyclonic power disruption.

The Component 1 of resilient electrical network/UG(REN/UG) cabling project has been further divided into 6 packages for operational requirements as shown in **Figure 3.1**.

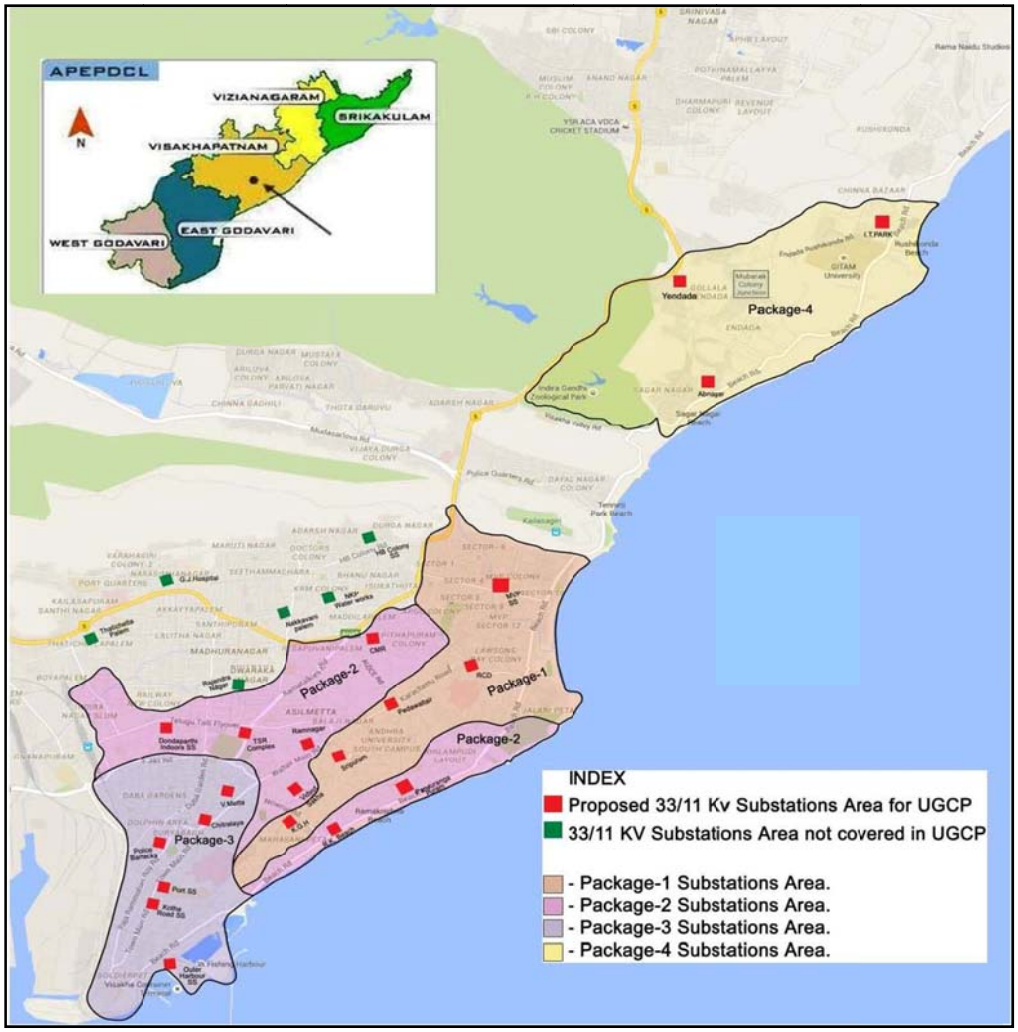

Figure 3.1: Location Plan of REN/UG Cabling Project under APDRP

3.6. PROJECT IMPLEMENTING UNIT

Andhra Pradesh Eastern Power Distribution Company Ltd. (APEPDCL) is the designated Project Implementation Unit (PIU) for the Resilient Network Component/UG cabling Project under APDRP.

Within Andhra Pradesh, APEPDCL is responsible for managing Sub-transmission, Distribution and bulk supply of power in the Operation Circles of Srikakulam, Visakhapatnam, and Vizianagaram, East and West Godavari districts and 20 Operation Divisions of Coastal Andhra Pradesh. APEPDCL supplies power to over 5.107 million consumers belonging to different categories through a network consisting of 656 Sub-stations of 33/11 KV level, 2704 feeders of 11 KV level and more than 151,447 distribution transformers of different levels. The Corporate Office and Headquarters of APEPDCL are situated at Visakhapatnam.

3.7. PROJECT PREPARATION FOR REN/UG

The Project preparation for REN/UG cabling project by APEPDCL included estimation of load flow studies of existing OH power distribution system (as of 2015), and prepare for replacement of existing OH system with underground cables with load condition of year 2022 in entire Visakhapatnam city area. APEPDCL has divided the REN/UG cabling component into 6 packages on the basis of operational requirements.

The Package-1 comprises of 5nos. 33/11kV Substations namely MVP Colony, Pedawaltair, KGH, LB Colony and Siripuram.

3.8. GENERAL ARRANGEMENT OF REN/UG CABLES

The project preparation studies for REN/UG cabling project component of APDRP has proposed four configurations/general arrangement of cable trenches for underground cables under package 1 as shown in **Figures 3.2**. The cumulative length of cable trenches under Package 1 of the REN/UG cabling project is 165 km and the configuration wise break up of cable trench length are given in **Table 3.1**. The REN/UG Project component will also include construction of manholes at every 250 metres all along the 165 km long UG cable route to facilitate maintenance, trouble shooting and repairs of the damaged UG cables(if any), during the operation phase.

Table 3.1: Type and Length of Cable Trenches under Package 1

		Trench Length in Km					
S.No.	**Configuration Type**	**PEDAWALTAIR**	**LB COLONY**	**KGH**	**MVP**	**SIRIPURAM**	**TOTAL**
1	Type-1: 1250mm & 1000mm	2.304	6.837	1.049	9.476	3.914	**23.580**
2	Type-2: 900mm & 1000mm	15.655	7.850	8.422	13.085	6.080	**51.092**
3	Type-3: 900mm & 1000mm	5.250	1.137	2.808	1.268	4.219	**14.682**
4	Type-4: 650mm & 1000mm	16.768	13.472	10.683	28.638	6.288	**75.849**

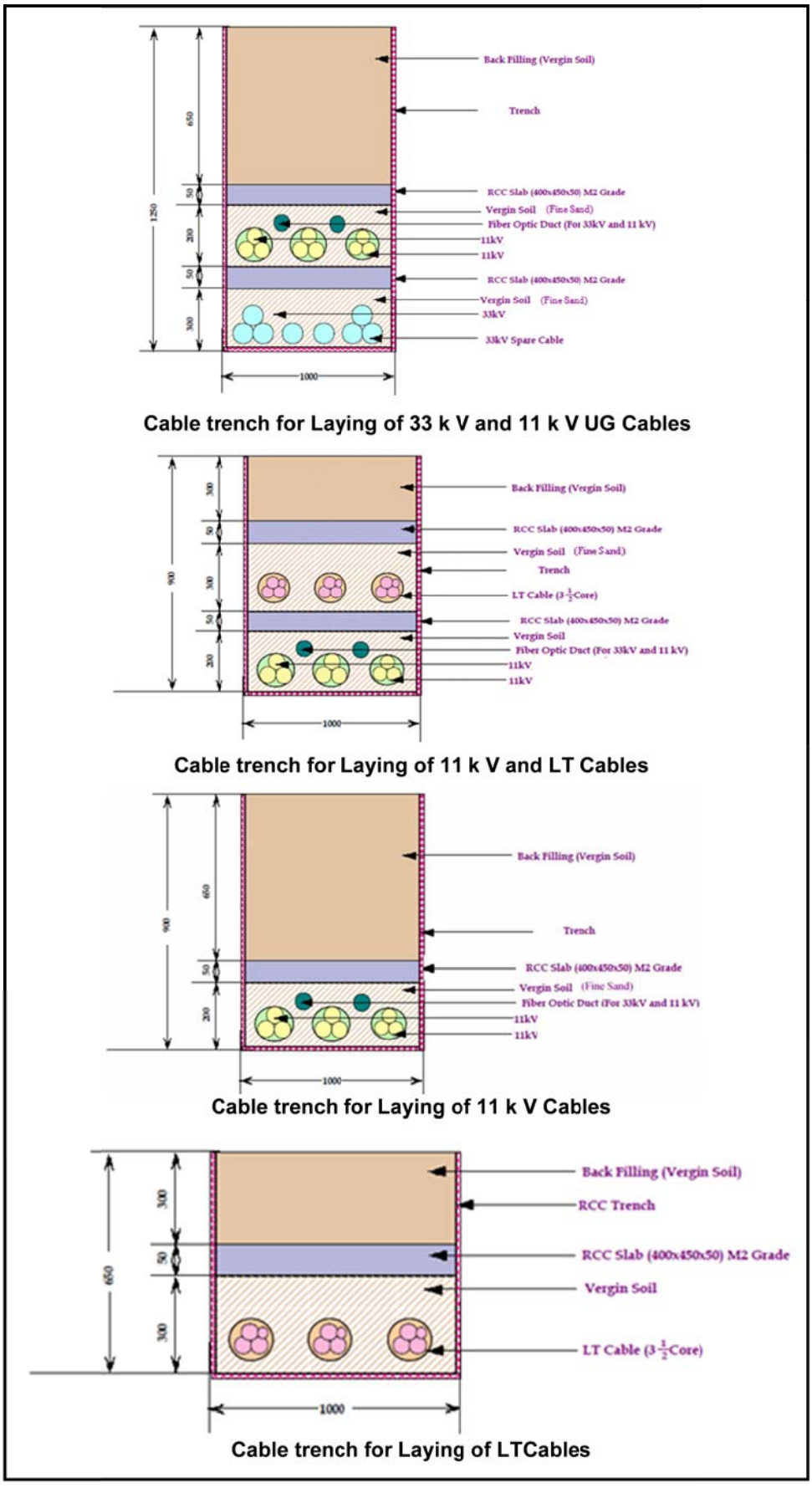

Figure 3.2: General Arrangement of Cable Trenches for UG Cables under REN Project

3.9. ROUTE ALIGNMENT OF CABLE TRENCHES

The Project preparation studies have proposed to lay the underground cables along side of footpath and road. The alignment of cable routes have been finalized after due consideration of several factors like most optimal length, analysis of alternatives, minimum obstacles among other influencing factors. Therefore, UG cable routes as proposed in the DPR drawings is considered as final for assessment of the likely environmental and social impacts. A typical snap shot of the cable route alignment as proposed by APEPDCL is given in **Figure 3.3**.

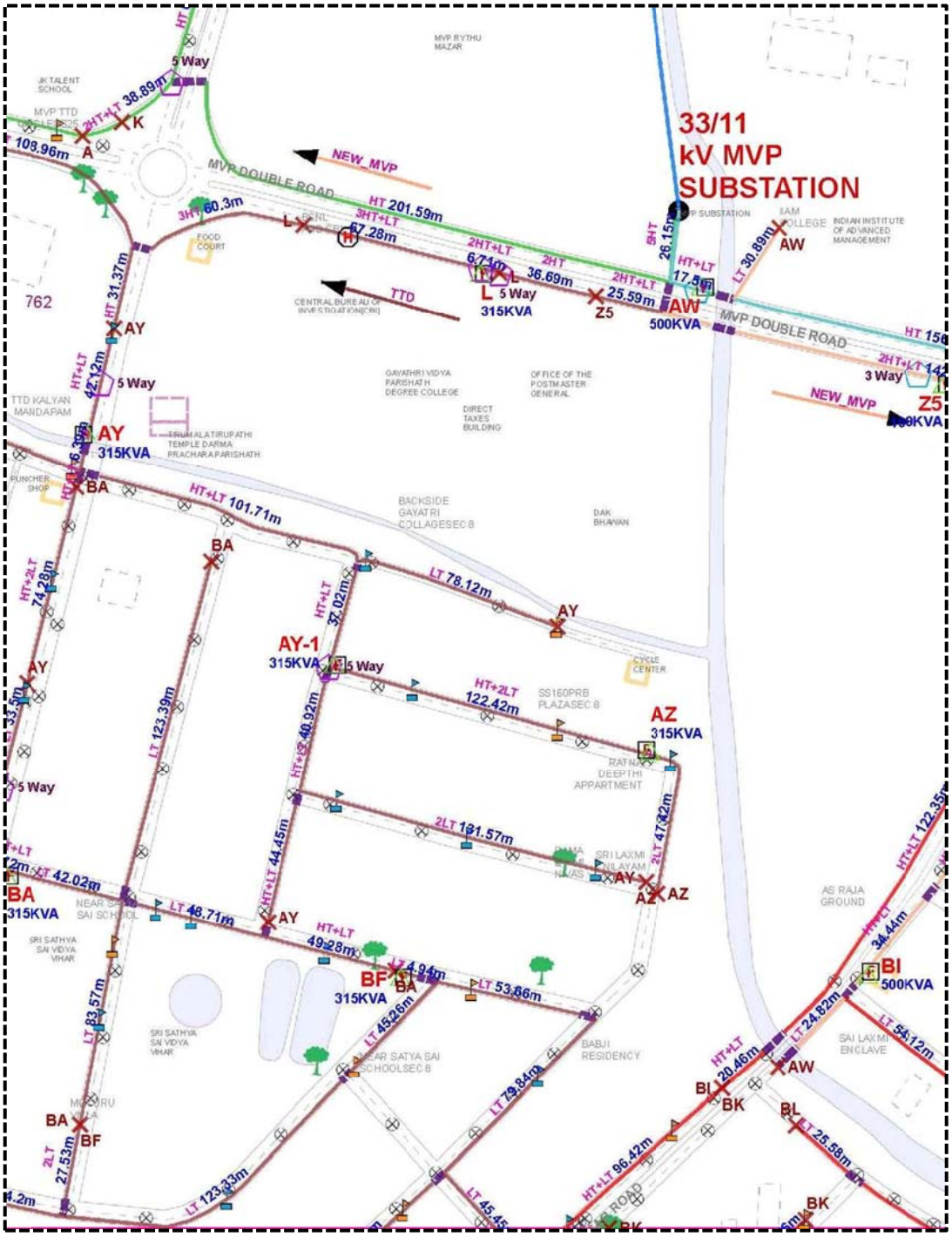

Figure 3.3: A Typical Snap Shot of the Cable Route Alignment as Proposed by APEPDCL
(Extracted from 33/11kV Substation Cable routing map for illustration)

3.10 OBSTACLES ALONG CABLE ALIGNMENT

The project preparation studies by APEPDCL have made an assessment of obstacles along cable routes, based on field surveys for laying of cables. The summary of the probable obstacles for laying of cables under package 1 is given in **Table 3.2**.

Table 3.2: List of Estimated Obstacles under Package 1 REN/UG Cabling Project

S.No.	Description		Unit	PEDAWALTAIR	LB COLONY	KGH	MVP	SIRIPURAM	TOTAL
1	Ring Main Unit	5 way	No.	50	19	30	41	34	174
		3 way	No.	11	6	8	7	8	40
2	New DTRs	500kVA,11kV/433V	No.	58	26	28	44	25	181
		315kVA,11kV/433V	No.	32	19	18	37	7	113
		160kVA,11kV/433V	No.	4	2	4	2	3	15
3	Feeder Pillars		No.	141	61	82	105	97	486
4	Service Pillars	a) Up to 12 connections	No.	62	55	53	180	17	367
		b) Up to 24 connections	No.	546	339	405	407	123	1820
5	Number of Temporary Shops		No.	21	12	17	39	13	102
6	Length Covered by Temporary Shops		Km	0.141	0.080	0.223	0.467	0.088	0.999
7	Road Crossing Ducts	Number of Crossings	No.	471	299	300	510	145	1725
		Total Length of Crossings	Km	1.961	1.311	1.026	2.389	0.887	7.574
8	Water Crossing Ducts	Number of Crossings	No.	13	16	1	16	2	48
		Total Length of Crossings	Km	0.045	0.043	0.006	0.123	0.008	0.225
9	Length Parallel to	Drainage	Km	27.22	18.949	15.639	40.774	10.342	112.924
		Footpath	Km	3.436	0.637	0.994	20.589	3.009	28.665
10	Length to be Demolished	Footpath	Km	2.291	0.425	0.663	13.726	2.006	19.110

3.11 REMOVAL OF THE EXISTING OH SYSTEM INFRASTRUCTURE

The REN/UG cabling project also includes dismantling of all existing over head infrastructure (includes OH lines and DTR on an on as-is where-is basis, after commissioning of the newly laid underground cabling network. The existing OH system (2015) infrastructure under Package-1 is given in Table 3.3.

Table 3.3: Existing OH Infrastructure under Package 1

S.No.	Particulars	Unit	Quantity
1.	Network Area of Zone-1 (Package-1)	Sq.km	8.199
2.	33/11 KV Substation	No.	5
3.	11 kV Feeders	No.	29
4.	33 kV Line	Km	32.08
5.	11 kV Line	Km	85.32
6.	Power Transformer		
	a) Quantity	No.	10
	b) Total Capacity	MVA	74
7.	Distribution Transformers		
	c) Quantity	No.	1,027
	d) Total Capacity	MVA	115.47
8.	LT Line	Km	120.63
9.	Consumers	No.	51,099
	a) HT Consumer	No.	100
	b) LT Consumer (Three Phase)	No.	17,280
	c) LT Consumer (Single Phase)	No.	33,719

SECTION 4
BASELINE ENVIRONMENT PROFILE

4.1 GENERAL

This section briefly describes the baseline environmental profile of the Visakhapatnam city, within which the REN/UG cable project will be implemented. The baseline environmental profile has been summarised from both secondary data base and primary assessments.

4.2 PROJECT AREA AND CORRIDOR OF IMPACT

The REN/UG cabling project is envisaged to be implemented within the fully urbanised city limits of Greater Visakhapatnam Municipal Corporation (GVMC), under Visakhapatnam Urban district. The corridor of impact of REN/UG cabling project is limited to 2m (extending up to 0.5 metre on either side of the 1 metre wide cable trench), along the cable routes, which shall remain barricaded from start to until the completion of road restoration works and site is cleared prior to moving on to next segment of the cable route in 500 metre lengths.

The corridor of impact or operational area for cable laying operations is depicted in **Figure 8.1**, under Section 8 – Analysis of Alternatives

The cable laying activities from initial site clearance and up to road restoration will be limited to barricaded operational area, unlike area development projects, which may have ramifications well beyond the construction site.

4.3 ENVIRONMENTAL PROFILE

The baseline assessment of the climate and weather conditions is significant in this project as this can influence work progress and project implementation schedule of REN/UG cable project. The following sections describe the key elements of the climate, viz., temperature, wind, rainfall and relative humidity and evaporation.

4.2.1 Climate

Climatologically, Vishakhapatnam experiences tropical sub-humid type of climate with moderate summer and good seasonal rainfall. The southwest monsoon sets in the second week of June and lasts till September end. October and November receive rainfall from northeast monsoon. Winter seasons are generally cool and fine weather prevails from December to February followed by summer season extending up to early or middle of June.

4.2.2 Temperature

The annual daily mean temperature within Visakhapatnam city ranges between 23.7°C and 32.5°C. May is the hottest month with a daily mean maximum at 36.2°C and January is the coldest month with the daily mean minimum at 18.0°C. The highest and lowest temperature ever recorded in Visakhapatnam is 45.3 in June and 13.6 °C in January.

4.2.3 Wind Speed

Wind speeds in Visakhapatnam range between light to moderate from April to August months. During the post-monsoon and cold season (November to February), winds blow mostly from the east or north-east directions. With the onset of summer, (March onwards), south westerlies and westerlies are dominant and continue during the rest of summer upto May end or early June. The south west monsoon season winds are mostly from directions

between South-west and North West. The general dominant flow pattern is south westerly during monsoon, whereas the wind direction is easterly in the post-monsoon and winter seasons.

4.2.4 Cloud Cover

Visakhapatnam has nearly 145 days of clear sunshine in a year (i.e., without cloud or 0 Oktas of cloud cover). As per the data recorded by the India Meteorological Department, the region has a cloud cover of 8 Oktas (i.e., 100% of sky is covered with clouds or complete overcast) over 51 days in a year and for the remaining days, the cloud cover generally ranges between 2 and 7 Oktas in a year (i.e., 25%-75% of sky is covered with clouds).

4.2.5 Rainfall

The average annual rainfall of Vishakhapatnam is 968.8 mm and monthly rainfall ranges from 11.4 rainfall in January to 204.3 mm in October. October is the wettest month of the year. The mean seasonal rainfall distribution is 556.2 mm in southwest monsoon (June September), 277.5 mm. in northeast monsoon (October-December), 19.1 mm. rainfall in winter (Jan-Feb) and 92.9 mm in summer (March–May). The percentage distribution of rainfall, season-wise, is 57.41% in southwest monsoon, 28.64 % in northeast monsoon, 1.97% in winter and 0.96 % in summer.

4.2.6 Humidity

Visakhapatnam experiences humid conditions ranging between 64% - 74% throughout the year. Generally morning hours are more humid than evening and humidity ranges from 67-79% in morning to 67-78% in evening hours.

4.2.7 Dust Storms and Visibility

As per the dust storm data recorded at meteorological observatory at Visakhapatnam, no dust storms have been recorded.The region has visibility of over 20 km for about 46 days in a year. The visibility reduces to a range of 4-20 km for about 311 days (evenly distributed throughout the year) and for about 3 days in a year (in months of November, December and January), the visibility ranges between 1 km to 4 km.

4.2.8 Vulnerability to Cyclones and Natural Disasters

Andhra Pradesh, because of its long coastline and geographical location is one of the most vulnerable states to multiple natural disasters in India. The State has 974 km of coastline, the second largest in the country after Gujarat. Nine coastal Districts of the state account for approximately 69% (34.19 million) of the total population of 49.3 million, who are vulnerable to cyclones and natural disasters. The most recent natural disaster occurred at Visakhapatnam is Hudhud in October 2014. The vulnerability and frequency of damaging speeds recorded along Visakhapatnam and other coastal districts are given in **Figure 4.1, 4.2 & 4.3**.

4.2.9 Geology and Soil

Geologically, Visakhapatnam district can be divided into three regions, viz., and northern hilly terrain with valleys, middle pediplains and alluvial coastal plains. The entire REN/UG cabling routes under package 1 fall under the middle pediplains and coastal plains.

The soils of Visakhapatnam district as a whole including the Visakhapatnam city area is pre-dominantly covered by Red Loamy soils (nearly 70% of the area) whereas Sandy Loamy

soils are the next dominant soils, followed by sandy soils and black cotton soils. The coastal stretches of the district including certain parts of Visakhapatnam city is dominant with sandy loamy soils. Generally, the soils are poor textured, easily drained, low in organic and Phosphorus content.

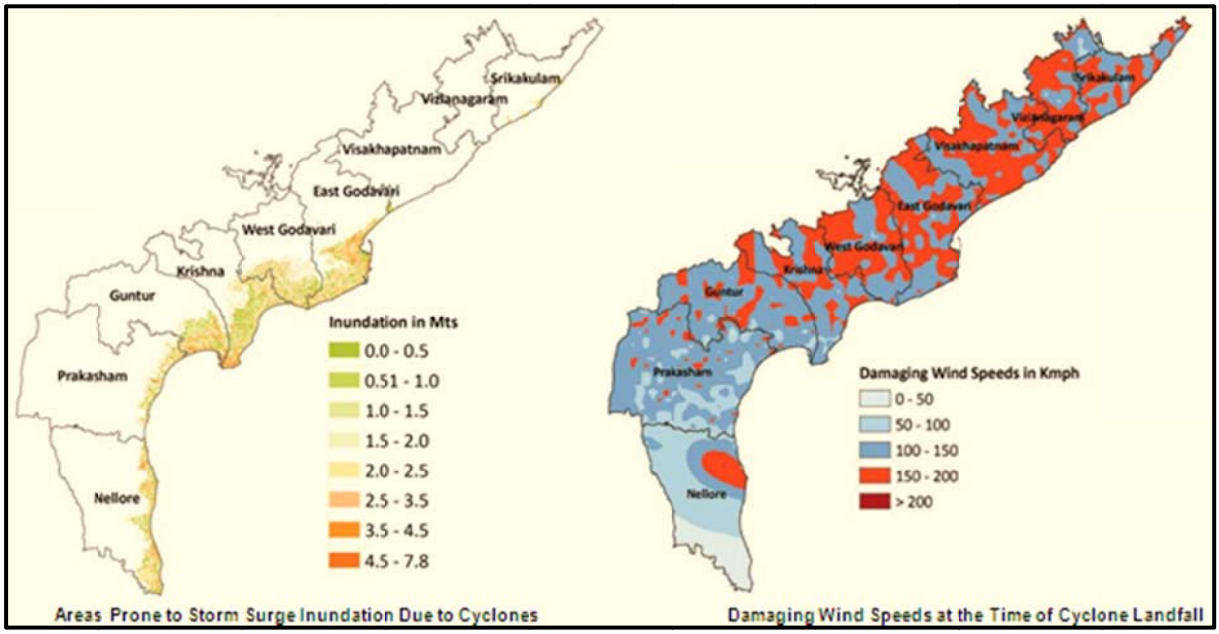

Figure 4.1: Inundation and Vulnerability Due to Cyclones along Coastline of Andhra Pradesh

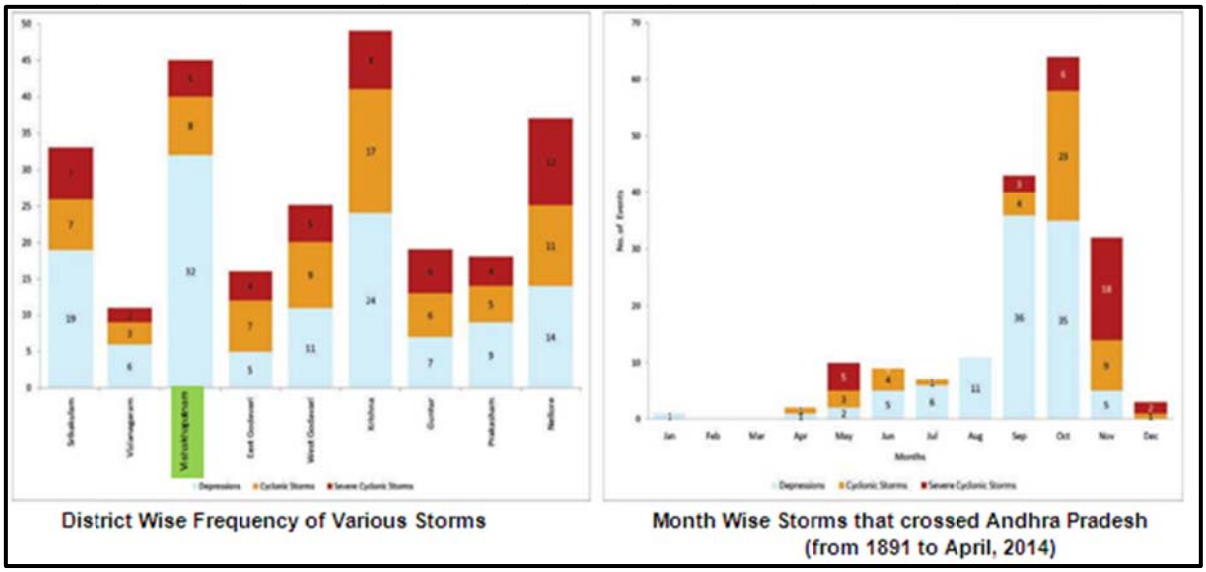

Figure 4.2: Frequency of Various Storms along Coastline of Andhra Pradesh

4.2.10 Seismic Hazard Risk and Vulnerability:

Vishakhapatnam falls under the stable zone II of seismic zoning classification (**see figure 4.4**) as notified by the Seismic Zoning Committee, Government of India. Seismic zone II is the most stable and zone V is considered to be least stable. The seismic zones I and II were merged during reorganization of seismic zones in year 2000.

The entire REN/UG cable project is within the most stable seismic zone **I**I and therefore not susceptible to any seismic risks.

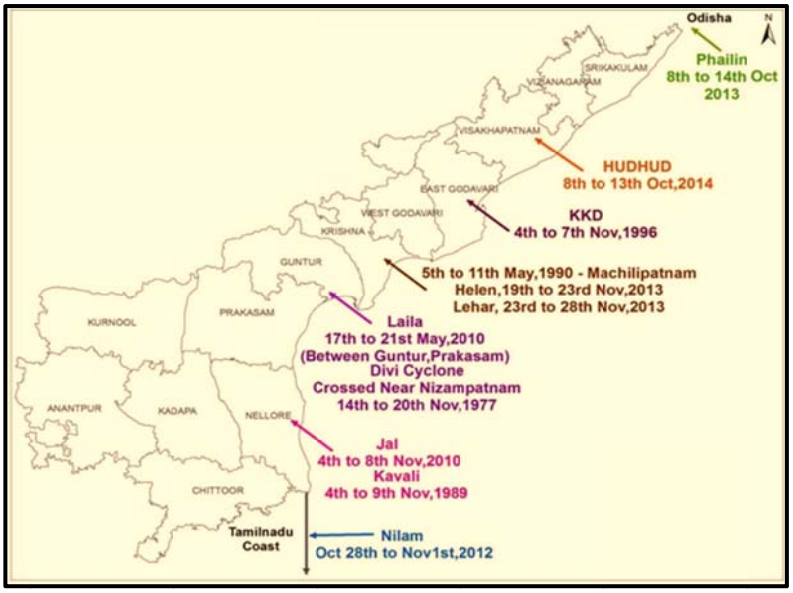

Figure 4.3: Major Cyclones along Coastline of Andhra Pradesh in Recent Years

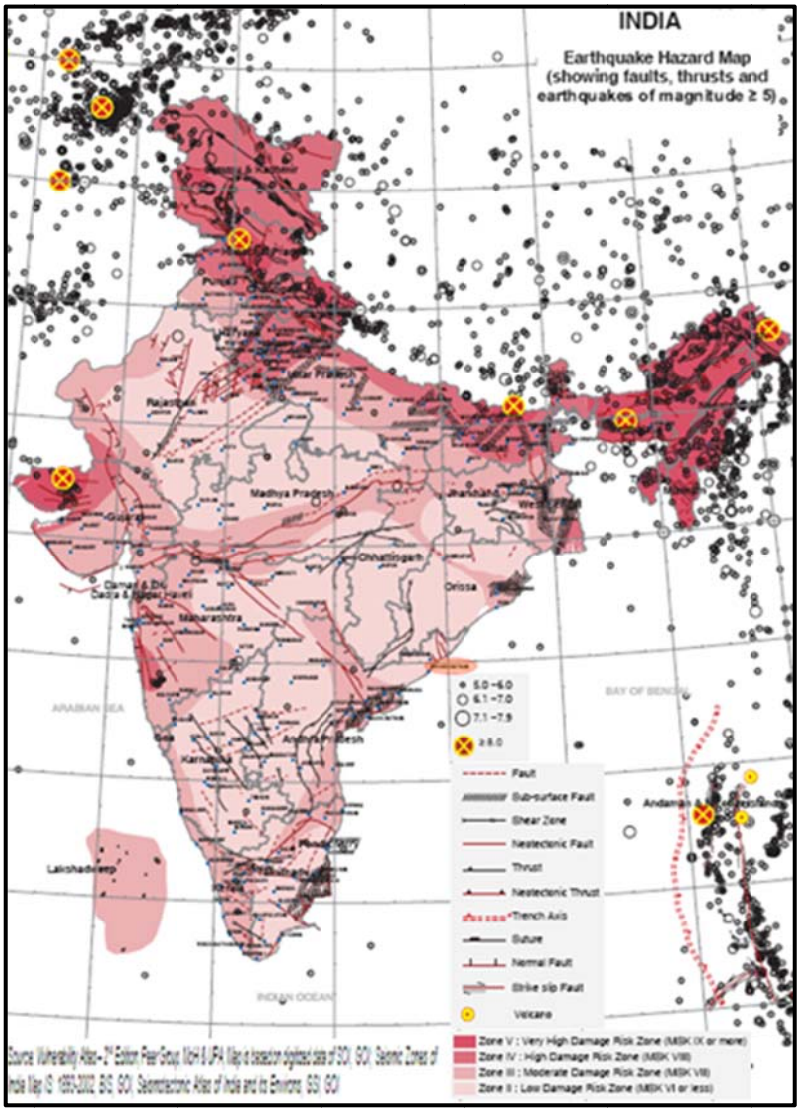

Figure 4.4: Seismic Zones of India

4.2.11 Ground Water

As per the data published by the Central Ground Water Board(as of year 2012), the depth to water level in most parts of the Visakhapatnam city varies between 2 to 5 meters below ground level **(see figure 4.5)** with very marginal or insignificant variation in depth to water levels between pre-monsoon and post monsoon seasons. The Visakhapatnam district as a whole including the city areas are under safe category for ground water development as the district is having vast untapped ground water resources. The maximum depth of the trenches to be excavated is limited to 1.5 metres under all configurations under the REN/UG cable project.

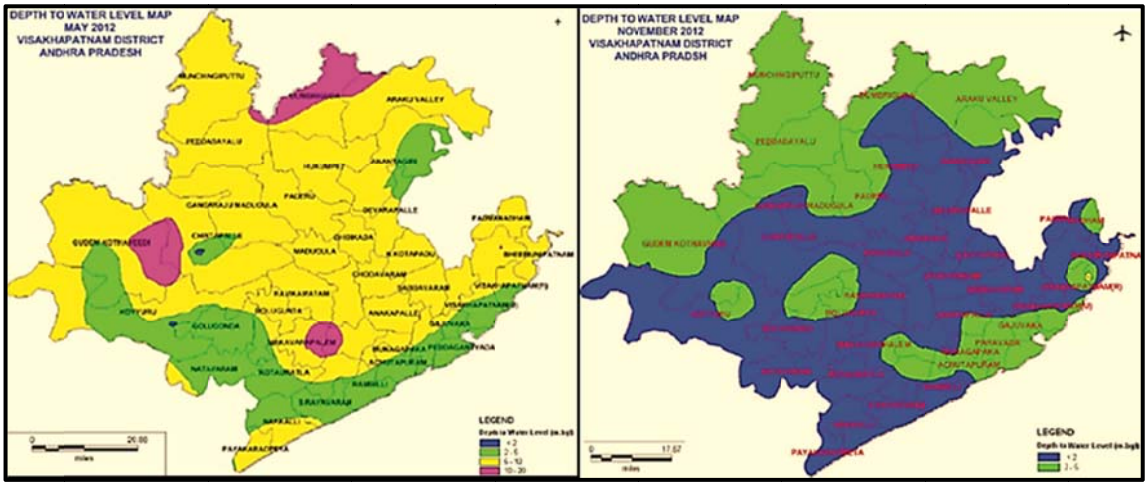

Figure 4.5: Depth to Water Level Map of Vishakhapatnam

4.2.12 Ambient Air Quality:

Within Visakhapatnam, ambient air quality monitoring is being monitored at 9 stations, out of which 6 stations are under National Ambient Air Quality Monitoring Program (NAMP) of Central Pollution Control Board (CPCB) and the remaining are monitored by State Pollution Control Board. The spread of the air quality monitoring stations and their representing areas/zones in Visakhapatnam is given in **Table 4.1**.

Table 4.1: Ambient Air Quality Monitoring Stations in Visakhapatnam

Sl No	Air Quality Sampling Station name	Zone/Category
1	Industrial Estate, Marripalem, NAMP	Industrial
2	Panchayat Raj Office, Mindi, NAMP	Residential
3	Police barracks, NAMP	Residential
4	INS, Virabahu, NAMP	Sensitive
5	Seetammadhara, NAMP	Residential
6	Ganapuram area, NAMP	Residential
7	St. Alloys	Residential
8	MCV Kalyana Mandapam	Residential
9	St. John Paris	Residential

Source: CPCB/SPCB

The respirable particulate matter (RSPM) and suspended particulate matter (SPM) levels at sensitive places/areas do not show any significant seasonal variations and is consistently above the National Ambient Air Quality Standards. The RSPM and SPM concentrations at residential and industrial places are higher in winter followed by summer months. Whereas the oxides of Sulphur and Nitrogen (SOx and NOx) levels are generally within the National Ambient Air Quality Standards, with the annual average concentrations for SOx and NOx are around 9 and 30ug/m3 respectively. The summary of the seasonal averages for RSPM, SPM, SOx and NOx are depicted in **Figure 4.6 and Table 4.2.**

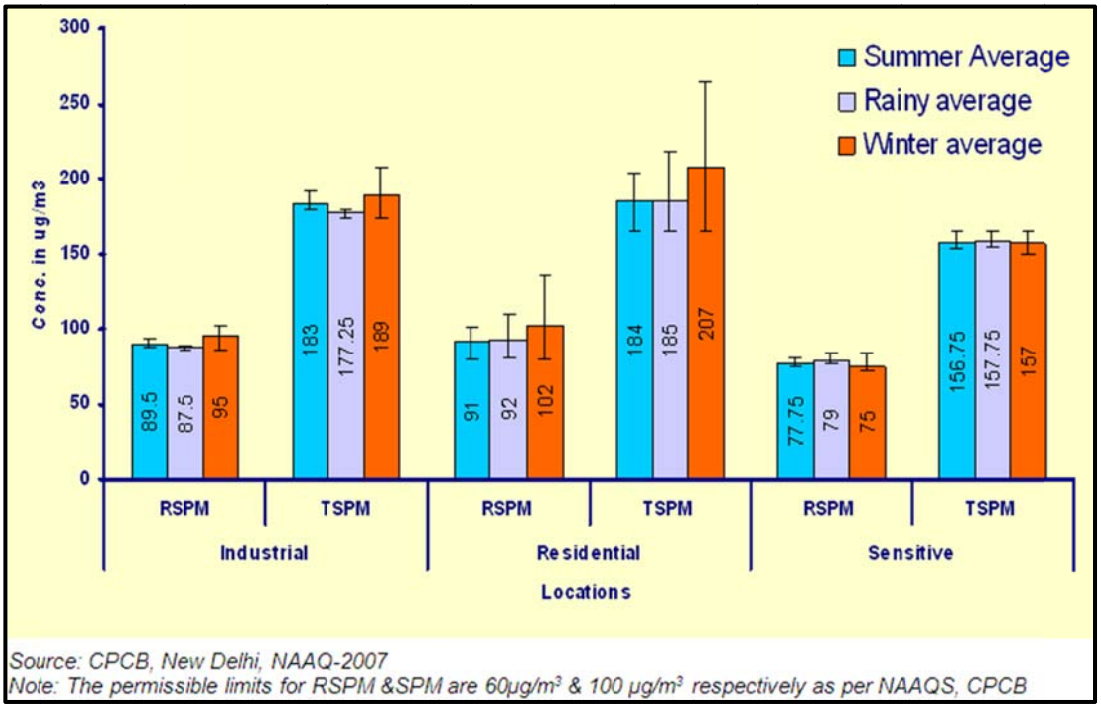

Figure 4.6: Seasonal Averages of RSPM and SPM Concentrations in Vishakhapatnam

Table 4.2: Seasonal variations in SOx and NOx levels in Visakhapatnam (in µg/m³)

Season	Industrial Area		Residential Area		Sensitive Area	
Parameter	SOx	NOx	SOx	NOx	SOx	NOx
Summer	8	30	9	30	8	30
Monsoon	8	30	8	30	8	30
Winter	8	30	9	30	9	30

Source: CPCB, New Delhi, NAAQ-2007
Note: The permissible limits for SOx & NOx is 80µg/m³ as per NAAQS, CPCB

4.2.13 Noise Level

Noise levels monitoring carried out by independent scholars/researchers within Visakhapatnam city limits, representing receptors like hospital (RCD hospital), residential area (Lawson's Bay Colony), city vehicular traffic (Jagadamba junction, Andhra Pradesh State Road Transport Corporation Complex junction and Seethammadhara junctions), sea side and coastal stretch (Santhi Ashram) and industrial zone (sea port area) indicate that noise levels generally exceed the permissible limits for both day and night at these locations.

The observed ambient noise level at RCD hospital was more than 10 dBA above the

permissible limits at any time. The background noise level at Santhi Ashram was approximately 3 dBA less at night time and 2 dBA less at day time as compared to ambient air quality noise standards for silent zone. The ambient noise levels at traffic and busy roads junctions were in the range of 80 +10 dBA, among which 75% values were found in the range of 110 +10 dBA, clearly beyond permissible ambient levels.

In summary, ambient noise levels across Visakhapatnam city particularly the commercial areas, roads and traffic junctions well as industrial zones exceed the permissible most as compared to coastal stretches, which still have relatively low ambient noise levels due to large expanse and quick dissipation.

4.2.14 National Parks and Wild Life Sanctuaries

Andhra Pradesh has 6 National Parks and 21 Wildlife Sanctuaries, out of which only one i.e. Kambalakonda Wildlife Sanctuary is in Vishakhapatnam. The wildlife sanctuary is on the northern side of Visakhapatnam city along NH5 and is spread over an areas of 625 acres (253 ha), amidst the scenic Eastern Ghats of India. It is surrounded by Eastern Ghats on 3 sides and Bay of Bengal on the fourth side.

The sanctuary has a high floral diversity and includes Tectonagrandis, Catunaregamspinosa, Grewiatiliaefolia, and Abrusprecatorius among others.

Kambalakonda wildlife sanctuary also has a zoo, which has enclosures for nearly 80 species of primates, carnivores, lesser carnivores, small mammals, reptiles and birds aviaries.

4.2.15 Important Bird Areas

Andhra Pradesh has 13 designated Important Bird Areas, out of which none are situated within Visakhapatnam.

4.2.16 Olive Ridley Turtle Nesting Sites:

The sea coast between Visakhapatnam and Bheemili is important and sporadic nesting ground for Olive Ridley Turtles (*Lephidochelysolivacea*), endangered and protected species in Schedule-I of Wildlife Protection Act, 1972 and listed as Vulnerable in IUCN red list. The Visakha society for protection and care of Animals (VSPCA), Vishakhapatnam Foundation jointly with Andhra Pradesh Forest Department has been jointly working towards protection of the sea turtles along the sea coast of Vishakhapatnam to Bheemili.

The REN/UG cabling project is limited to well within the city urban roads and does not extend into anywhere on to beach areas.

4.2.17 Heritage Resources

Visakhapatnam has 31 identified heritage resources, out of which 2 fall under the category of sacred sites, 7 under religious precincts, 12 under institutional buildings, 2 under residential bungalows, 2 under cultural heritage sites, 2 under archaeological monuments and 4 under common structures. The list of heritage resources is given n **Table 4.3**.

Table 4.3: List of Heritage Resources in Vishakhapatnam		
S. No	**Heritages**	**Typology**
1	Christian Cemetery and Kurupam monument	Scared sites
2	Temples of Simhachalam*, Jagannadha Swami, Siva temple at Appikonda*, Venkateswara Swami; Church at hill top, Kottvedhi Church and Kottvedhi Dargha	Religious precincts
3	Masonic Lodge, Collectorate, District Court, King George Hospital, Town Hall, St. Aloysius School, Jeypore Vikram Dev College, Rani Chandramani Devi Hospital, Visakha Museum, Queen Mary School, Waltair Club building and Circuit House	Institutional buildings
4	Hawa Mahal and Railway Guest House	Residential bungalows
5	Kali Temple and Kanaka Mahalakshmi Temple	Cultural heritage sites
6	Bavikonda* and Thotlakonda*	Archaeological
7	Victoria Memorial Pavilion and Light Houses (3nos)	Common structures

**VUDA (2007) (As identified by Temporary Heritage Committee, 2001)*

Source: Heritage Conservation in Visakhapatnam Metropolitan Region - An Overview of Planning and Administrative Tools; International Journal of Urban Planning and Transportation, ISSN:2051-9281, Vol.28, Issue.2

SECTION 5
SOCIO-ECONOMIC PROFILE

5.1 GENERAL

The REN/UG project will be implemented at Visakhapatnam in Andhra Pradesh state of India. Andhra Pradesh, situated on the south eastern coast of the country is the eighth largest state in India covering an area of 160,205 Sq. Km, after the bifurcation in June 2, 2014, the north-western portion of the state was separated to form a new state of Telangana. In accordance with the Andhra Pradesh Reorganisation Act, 2014, Hyderabad will remain the de jure capital of both Andhra Pradesh and Telangana states for a period of 10 years from 2014

There are two regions in the newly formed Andhra state namely Coastal Andhra and Rayalaseema. These two regions comprise 13 districts, with 9 in Coastal Andhra and 4 in Rayalaseema. Andhra Pradesh has got a coastline of around 974 km, which gives it the 2nd longest coastline in the nation after Gujarat. Besides, the state includes the eastern part of Deccan plateau as well as a considerable part of the Eastern Ghats. The geographical location of state makes it vulnerable to many natural disasters like one Hudhud occurred on Oct 12, 2014 causing great devastation.

The state is bordered by Telangana in the north-west, Chhattisgarh in the north, Odisha in the north-east, Karnataka in the west, Tamil Nadu in the south and the water body of Bay of Bengal in the east. A small enclave of 30 km^2 of Yanam, a district of Puducherry, lies south of Kakinada in the Godavari delta to the northeast of the state.

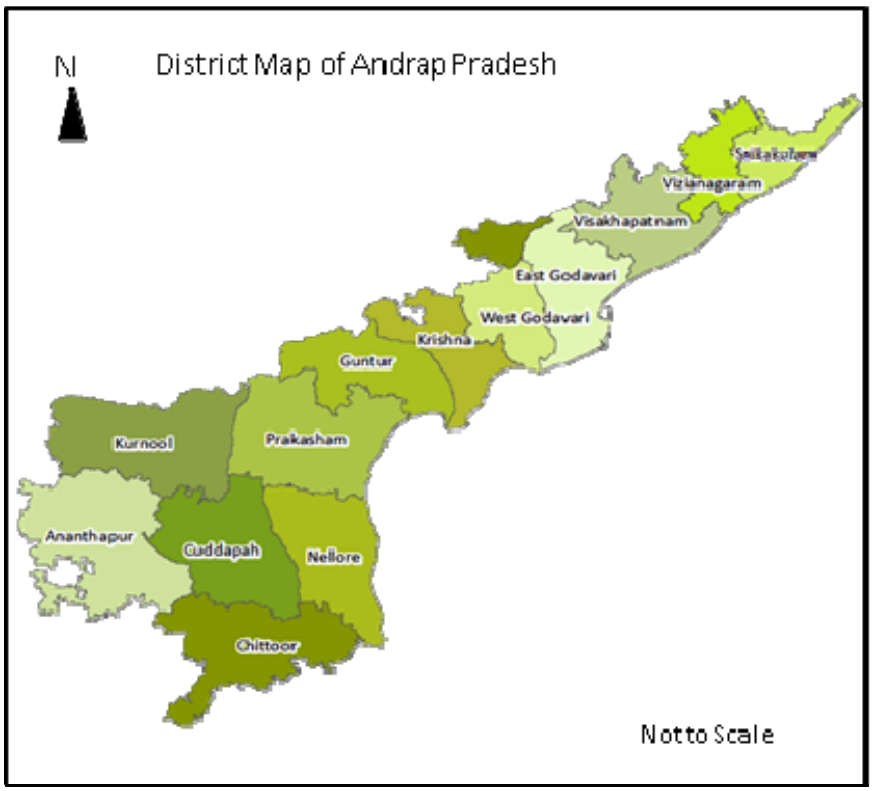

Figure 5.1: State of Andhra Pradesh (Project State)

5.2 SOCIAL AND DEMOGRAPHIC PROFILE OF THE STATE

5.2.1 Population

As of 2011 Census of India, the state had a population of 49,386,799 with a population density of 308/km2. The total population constitutes 70.4% of rural population with 34,776,389 inhabitants and 29.6% of urban population with 14,610,410 inhabitants. Children in the age group of 0–6 years are 5,222,384, constituting 10.6% of the total population, among them 2,686,453 are boys and 2,535,931 are girls. Visakhapatnam district has the largest urban population of 47.5% and Srikakulam district with 83.8%, has the largest rural population, among others districts in the state. The overall population of the state comprises 17.1% of Scheduled Caste and 5.3% of Scheduled Tribe population.

5.2.2 Gender classification

There are 24,738,068 male and 24,648,731 female citizens—a sex ratio of 996 females per 1000 males, higher than the national average of 943 per 1000 males. The sex ratio in children 944 is also higher than the nation average of 919.

5.2.3 Literacy Rate

The literacy rate of the state stands at 67.41%. West Godavari district has the highest literacy rate of 74.6% and Vizianagaram district has the least with 58.9%.

Table 5.1: State Andhra Pradesh at a Glance

S.N.	Development Indicators	Numbers/ Percentage
1	Population (2011 census)	49,386,799
2	Density of Population (2011)	308 person per sq.km
3	Percentage of Male Population	50.1%
4	Percentage of Female Population	49.9%
5	Sex Ratio	996
6	Percentage of Population between 0 to 6 Years	10.6%
7	Literacy Rate (2011)	67.41%
8	Male Literacy Rate	74.8%
9	Female Literacy Rate	60%
10	Percentage of Scheduled Caste Population	17.1%
11	Percentage of Tribal Population	5.3 %
12	Percentage of Total Workers	46.5%
13	Percentage of Main Workers	83.7%
14	Percentage of Marginal Workers	16.3%
15	Percentage of Non-Workers	53.5%
16	Percentage of Main Cultivators	13.4%
17	Percentage of Main Agriculture Labour	37.3%

Source: Official portal of Andhra Pradesh Government, Govt. of AP

5.2.4 Economy of the State

Andhra Pradesh has a very diverse geography which led to a very diverse economy. 60 % of the population of the state is engaged in agriculture and allied sectors. Paddy is grown in large quantity and hence, rice is the staple food of the state. The fertile river plains in the delta regions of major peninsular rivers of Godavari and Krishna are rich with agriculture-based industries. 9 of the 13 districts of the state have sea coast along the Bay of Bengal, which has created manufacturing and export centric industries. The mineral deposits found in the districts of Rayalaseema, Eastern Ghats and neighbouring states has led to large-scale ore exports.

5.2.5 District Visakhapatnam

Visakhapatnam district occupies an area of approximately 11,161 square kilometres in Andhra Pradesh. The boundaries of this district are Bay of Bengal in the East, East Godavari district in the South, Orissa state in the West and North directions. The district has population of 42,90,589 as per the 2011 census which accounts for 8.68 % of the total population of the State with 11.89% decadal growth. The demographic profile of Visakhapatnam district is given Table 5.2 hereunder.

Table 5.2: Demographic Profile of Visakhapatnam

S.N.	Development Indicators	Numbers/ Percentage
1	Population (2011 census)	42,90,589
2	Population Growth (Decadal)	11.89
3	Density of Population (2011)	384 Person per sq. km.
4	Percentage of Male Population	49.8%
5	Percentage of Female Population	50.2%
6	Sex Ratio	1006 Females per 1000 Males
7	Percentage of Population between 0 to 6 Years	10.5%
8	Literacy Rate (2011)	66.9 %
9	Male Literacy Rate	74.6%
10	Female Literacy Rate	59.3%
11	Percentage of Scheduled Caste Population	7.7%
12	Percentage of Tribal Population	14.4%
13	Percentage of Total Workers	44.05%
14	Percentage of Main Workers	34.52%
15	Percentage of Marginal Workers	9.53%
16	Percentage of Non-Workers	55.95%
17	Percentage of Main Cultivators	17.05%
18	Percentage of Main Agriculture Labour	30.63%

Source: District Census Handbook 2011, Series-29, Part XII-B, Directorate of Census Operations, And Pradesh, Official portal of Andhra Pradesh Government, Govt. of AP

The District presents two distinct Geographic divisions. The strip of the land along the coast and the interior called the plains division and hilly area of the Eastern Ghats flanking it on the North and West called the Agency Division. The plains division with altitude 75

metres watered and drained by Sarada, Varaha and Thandava Rivers and rivulets Meghadrigedda and Gambheeramgedda.

Inscriptions indicate that the District was originally a part ofKalinga Kingdom subsequently conquered by the Eastern Chalukyas in the 7th Century, A.D. who ruled over it with their Head Quarters at Vengi. This District was also under the occupation of various rulers such as the Reddy Rajahs of Kondaveedu, the Gajapathis of Orissa, the Nawabs of Golkonda and the Moghal Emperor Aurangazeb through a Subedar. This territory passed on to French occupation in view of succession dispute among Andhra Kings and finally it came under the British Reign.

The Visakhapatnam District was reconstituted with the remaining area and residuary portions of Ganjam District namely Sompeta, Tekkali and Srikakulam Taluks in entirety and portion of Parlakimidi, Ichchapuram, Berahmpurretained in Madras presidency. With the passage of time, the reconstituted District was found administratively unwieldy and therefore it was bifurcated into Srikakulam and Visakhapatnam districts in the year 1950. The residuary district of Visakhapatnam was further bifurcated and the Taluks of Vizianagaram, Gajapathinagaram, Srungavarapukota and portion of Bheemunipatnam Taluk were transferred to the newly created Vizianagaram District in the year 1979.

Administratively, the district is divided into four revenue divisions, namely Anakapalli, Paderu, Narsipatnam and Visakhapatnam, each headed by a sub collector. These revenue divisions are divided into 43mandals in the district. These districts consist of 3265 villages and 15 towns including, 1 Municipal Corporation, 2 municipalities and 12 census towns. Visakhapatnam city is the only municipal corporation.

Of the total geographical area of district 36.45% alone is arable area while 39.53% is forest area. The rest is distributed among "Barren and uncultivable land" about 11.7% and "Land put to non-agricultural uses" about 9.0%. Out of the arable area, the net area sowed form 27.2% while cultivable waste and fallow (current and old) lands constitute about 9.2%.

Agriculture is the mainstay of nearly 70% of the households. The productivity of the crops is low as the irrigated area is only 36 %. The agriculture activities are supported by animal husbandry. Fishing is another important economic activity of the fishermen population living in about 59 fishery villages and hamlets on coastline stretching to a length of 132 KMs. covering 11 coastal mandals. Visakhapatnam district is the central hub for industry and education in the state of Andhra Pradesh. Visakhapatnam district hosts the Vizag Steel Plant and many other small and large scale industries. The district is found rich in mineral deposits like Rock Phosphate, Quartz and clay deposits.

5.2.6 The Visakhapatnam City

The Visakhapatnam city, also known as Vizag is located between the Eastern Ghats mountain range and the Bay of Bengal is the largest city, both in terms of area and population in the Indian state of Andhra Pradesh. It is the administrative headquarters of Visakhapatnam district and also the Financial Capital of Andhra Pradesh. It is well connected by air, rail and road with all the major cities in India.

5.2.6.1 Historical Perspective

Historically, Visakhapatnam was considered part of the Kalinga region, and later ruled by the Vengi kingdom, the Pallava and Eastern Ganga dynasties. Archaeological records suggest that the present city was built around the 11th and 12th centuries CE with control over the

city fluctuating between the Chola Dynasty and the Gajapati Kingdom until its conquest by the Vijayanagara Empire in the 15th century. Conquered by the Mughuls in the 16th century, European powers eventually set up trading interests in the city, and by the end of the 18th century it had come under French rule. Control passed to the British in 1804 and it remained under British colonial rule until India's independence in 1947. After independence, Visakhapatnam developed into one of the country's chief ports and became the headquarters of the Eastern Naval Command of the Indian Navy

5.2.6.2 Demographic Profile of Visakhapatnam City

In 2011, Visakhapatnam district of Andre Pradesh had population of 4,290,589 of which male and female were 2,138,910 and 2,151,679 respectively. The growth of district population is found to be high. There was change of 11.96 percent in the population compared to population as per 2001, while in 2001 it was recorded increase of 16.66 percent to its population compared to 1991.

Visakhapatnam city is the largest city in AP having total population around 1,728,128 (2011 Census). The total population constitutes 873,599 males, 854,529 females with a sex ratio of 978 females per 1000 males. There are a total of 1,279,137 literates, of which 6,88,678 were male and 5,90,459 were females literates. The average literacy rate of the city was found to be 81.79%. There were 164,129 children in the age group of 0–6 years, with 84,298 boys and 79,831 girls. The child sex ratio was 947 girls per 1000 boys. Visakhapatnam is ranked 122 in the list of fastest-growing cities in the world. Hinduism is practiced by the majority of its citizens, followed by Islam and Christianity.

There are many public sector companies like Visakhapatnam Port Trust, Visakhapatnam Steel Plant, Hindustan Shipyard Limited, Hindustan Petroleum Corporation Limited, Mines and Minerals Trading Corporation (MMTC), National Mineral Development Corporation (NMDC) etc. and also Private sector companies like Coromandal Fertilizers Limited and LG Polymers located in this city of destiny. The Visakhapatnam city is one of the major port cities of the state of Andhra Pradesh with the highest recorded throughput in India.

5.2.6.3 Economic Profile of Visakhapatnam

The City of Golden Beaches, Visakhapatnam was a small hamlet of traditional fishing community at the time of Indian Independence. The natural harbor and right location, just midway between Calcutta and Chennai; proximity to the developed network of road and rail has metamorphosed this tiny village to an ever expanding industrial city.

The city has developed into a logistics haven for the heavy industries. The world class port is suitable for steel, petroleum and fertilizer industries. Visakhapatnam Steel Plant, RashtriyaIspat Nigam Limited and Essar Steels Limited are located here along with industan Petroleum Corporation Limited, the thermal power plant built by NTPC.

The other heavy industries contributing to the growth of Visakhapatnam are Hindustan Zinc Limited, Coromandel Fertilizers and Rain Calcining Limited. The Visakhapatnam port though commissioned in the early thirties came under the Visakhapatnam Port Trust in 1964 after promulgation of the Major Port Act 1963. The ship building industries like the Hindustan Shipyard Limited and Bharat Heavy Plate and Vessels Limited owe their genesis to the Visakhapatnam Port. The heavy industry gives employment to hundreds of thousands of people directly and indirectly runs the whole economy of the city.

The government has sanctioned a 9200 acre Special Economic Zone (SEZ) in the city. Big industrial houses, Reliance, the Birla Group, HPCL and Brandix from Sri Lanka have acquired huge estates in the SEZ. The SEZ will be a mini industrial town with chemicals, fertilizers, petroleum industries. Baba Atomic and Research Centre has proposed to set up an atomic R&D facility in the region. The Indian government has earmarked the rocky caverns of Visakhapatnam for building a strategic crude reserve for the nation.

5.3 CORRIDOR OF IMPACT OF REN/UG PROJECT

The Package -1 of REN/UG Cabling Project consists of 5 nos. of 33/11kV Substations of Zone-1 namely- Siripuram, Pedawaltair, MVP, L B Colony and KGH. The total network area of Zone-1 is 8.199 sq.km covering 51,099 consumers through LT and HT transmission lines.

After a review of trench excavation methods and assessment of minimum operational requirement, it was proposed to consider a 2 meter wide corridor as 'operational area or corridor of Impact' along the footpath, which are to be opened up for cable laying operations in 500 meter long segments. The COI area will be along footpath, with footpath/kerb being one edge, and other edge of corridor extending on to road up to a maximum of 2 m. Further, to minimize social impacts the manual excavation may be essentially required in narrow roads(less than 4 metres or even less than 2m in some cases), particularly, where LT cables are required to be laid to individual households/consumers. The corridor of impact or operational area for cable laying operations is depicted in **Figure 8.1**, under Section 8 – Analysis of Alternatives.

All the roads, along which underground cables are to be laid are under the jurisdiction of Greater Visakhapatnam Municipal Corporation (GVMC) and is lawfully owned by GVMC for road construction. Although road is owned by GVMC, a part of which will be used for underground cable laying(2 metre wide corridor) is not free of encumbrances, as can be seen in the strip maps. Using available records, the social team has verified the boundaries of legal right of way as well as boundaries of private properties within and in the vicinity of the corridor of impact. The limit of displacement will be limited not to the legal right of way but only to the corridor of impact. Within this corridor, there should be no structures or hindrances for underground cable laying.

In order to minimize disruptions to both pedestrian as well as to vehicular traffic, it is utmost necessary to limit the area of operation required for trenching, cable pullout, lowering, jointing, prior to refilling and restoring trench to its previous state and at the same time ensure minimum working space is available for completing work in a timely manner.

During social survey the impact on land, property and the livelihood of people within COI was examined and recorded.

5.4 SOCIO-ECONOMIC PROFILE OF THE AFFECTED HOUSEHOLDS

A 100% socio-economic survey was conducted within 2 metre wide COI (between 22 December 2015 to 20th January 2016) to register and document the status of the potentially affected population within the corridor of impact, their assets, and sources of livelihood. The survey provides a baseline information against which mitigation measures and support will be assessed. For this purpose, comprehensive information related to people's assets, income, socio-cultural and demographic indicators, religious structures, and other sources of support such as common property resources were collected during the survey. The analysis has covered the needs and resources of different groups and individuals, including intra-

household analysis and gender analysis. The questionnaire used for socio-economic the survey is attached as **Annexure-2.**

5.5 LIMITATION OF THE CORRIDOR OF IMPACT

The route/alignment proposed for laying of underground cable within package 1 has a few roads, which are less than 4 metres wide and even less than 2 metres wide in some cases. Laying of cable in such small roads, which are narrow, coincidentally congested and populated will involve significant disruptions to local populace/residents, if UG cables were to be laid by mechanical means of excavation. Further, the cable laying through manual excavation may also pose severe challenges in such narrow and congested roads.. The DPR for Package 1 does not suggest any alternative to this notable constraint.

5.6 FINDINGS OF THE SURVEY

As per the data collated from the socio-economic survey, the REN/UG cable project will impact 97 households and 366 PAPs under package-I. Out of total 366 PAPs, 52 % are male and 48 % are females. The sex ratio among the PAPs is found to be low in MVP and Siripuram Sub Station areas. The details of the affected population are given below in **Table 5.3**.

Table 5.3: Demographic Profile of Affected Households under Package 1

Sl.No	Sub Station wise Number of Affected Households and PAPs					
	Substation	No. of Affected Households	No. of PAPs	Male	Female	Sex Ratio
1	Siripuram	4	18	10	8	800
2	Pedawaltair	48	180	90	90	1000
3	MVP	20	84	49	35	714
4	LB Colony	2	8	4	4	1000
5	KGH	23	76	38	38	1000
Total		**97**	**366**	**191**	**175**	916

Source: Socio-Economic Survey, December 2015- January 2016

The distribution of respondents according to their age suggests that majority of them are young (27%between the age group 15-25 and 21.5 % between 25-35 yrs.). The details are presented in **Table 5.4** below.

Table 5.4: Age wise Distribution of PAPs under Package 1

Sl.No	Substation	No. of Affected Households	Age Groups					
			<15	15-25	25-35	35-45	45-60	>60
1	Siripuram	4	2	4	2	3	6	1
2	Pedawaltair	48	15	55	44	23	40	3
3	MVP	20	15	20	15	16	14	4
4	LB Colony	2	1	3	1	1	2	0
5	KGH	23	3	16	17	18	15	7
Total		**97**	**36**	**98**	**79**	**61**	**77**	**15**

Source: Socio-Economic Survey, December 2015- January 2016

The survey revealed that 93 % of the households are Hindus by religion, followed by 4% Muslims and only 3 % Christian. Most of the PAHs belong to OBC (67%) category of caste followed by General (18.5%) and SC and MOBC as 7.2% each. Not a single ST household was found along the COI and affected by the Project. The details of social categories (religion and caste) of the affected households are being provided in **Table 5.5** below.

Table 5.5: Social Category of PAHs under Package 1

Sl.No	Social Category of Affected Households									
	Religion					Caste				
	Substation	Hindu	Muslim	Sikh	Christian	Gen	SC	ST	OBC	MOBC
1	Siripuram	3	0	0	1	2	0	0	2	0
2	Pedawaltair	43	4	0	1	9	3	0	31	5
3	MVP	19	0	0	1	3	1	0	15	1
4	LB Colony	2	0	0	0	0	1	0	1	0
5	KGH	23	0	0	0	4	2	0	16	1
Total		**90**	**4**	**0**	**3**	**18**	**7**	**0**	**65**	**7**

Source: Socio-Economic Survey, December 2015- January 2016

Among all the PAPs, 61% are married, whereas the percentage of Widows and separated/divorced women was found to be 3% and 1.6% respectively. The marital status of PAHs is given in **Table 5.6** hereunder.

Table 5.6: Marital Status of Affected PAPs

Sl.No	Marital Status					Total
	Substation	Married	Un-married	Women		
				Widow	Separated	
1	Siripuram	10	7	0	1	18
2	Pedawaltair	110	62	5	3	180
3	MVP	50	33	1	0	84
4	LB Colony	2	5	1	0	8
5	KGH	50	20	4	2	76
Total		**222**	**127**	**11**	**6**	**366**

Source: Socio-Economic Survey, December 2015- January 2016

The socio-economic survey revealed that small families are generally havecome from other parts of the state, to earn livelihood in Visakhapatnam city. It was found that out of 97 PAHs, 73 (75%) are nuclear in their family composition. The average size of the family is around 4 members. The details are presented in **Table 5.7** below.

Table 5.7: Type and Size of Affected Households under Package 1

Sl.No	Substation	No. of Affected Households	Type of Family			Average Size of Family
			Nuclear	Joint	Extended	
1	Siripuram	4	4	0	0	4.2
2	Pedawaltair	48	36	12	0	3.7
3	MVP	20	15	5	0	4.2
4	LB Colony	2	2	0	0	4.0
5	KGH	23	16	7	0	3.3
Total		**97**	**73**	**24**	**0**	**3.7**

Source: Socio-Economic Survey, December 2015- January 2016

The educational profile of the respondents suggests that majority of them are illiterate (36.3%) further indicating the poverty and deprived conditions of the PAPs. Those who are attaining higher education (17%) are young, having average age of 21. The details are provided in **Table 5.8**.

Table 5.8: Educational Attainment of PAHs under Package 1

Sl.No	Sub Station wise Educational Profile of PAPs					
	Substation	Illiterate	Primary (Class 4)	Secondary (5-10)	Higher (Graduate)	Technical
1	Siripuram	10	1	7	0	0
2	Pedawaltair	66	18	63	33	0
3	MVP	29	16	27	11	1
4	LB Colony	1	0	6	1	0
5	KGH	27	5	26	18	0
Total		**133**	**40**	**129**	**63**	**1**

Source: Socio-Economic Survey, December 2015- January 2016

Distribution of socio economic survey respondents by their occupational categories, indicate that 31.4% of PAPs are working and 94% are engaged in business activities mainly selling of products on push cart (locally known as Bandy) along the road side. Around 10% of total PAPs are unemployed. The details are given in **Table 5.9**.

Table 5.9: Occupational Profile of Surveyed Population under Package 1

Sl.No	Substation	Working Status			Non-Working Status			
		Agriculture Labours	Trade/ Business	Private Service	No Job	Household Duties	Old/ Young	Student
1	Siripuram	0	6	1	0	3	4	4
2	Pedawaltair	1	56	2	21	56	5	39
3	MVP	0	19	1	9	19	5	31
4	LB Colony	0	2	0	2	1	1	2
5	KGH	0	25	2	4	19	9	17
Total		**1**	**108**	**6**	**36**	**98**	**24**	**93**

Source: Socio-Economic Survey, December 2015- January 2016

The annual income of affected Households varies between less than Rs. 25000.00 to above Rs. One lac. Around 31% households earn between Rs. 25000 to Rs. 50000, 38% between Rs. 50000-100000 and around 30 % above Rs. 100000. Only 1 household was reported to be having income less than Rs. 25000.00 per year. The details are given in **Table 5.10**.

Table 5.10: Income Level of Affected Households under Package 1

Sl. No.	Annual Income	Substation wise Number of PAHs					Total
	(in Rs.)	Siripuram	Pedawaltair	MVP	LB Colony	KGH	
1	Less than 25000	0	1	0	0	0	**1**
2	25000-50000	0	15	12	1	2	**30**
3	50000-100000	2	15	6	0	14	**37**
4	Above 100000	2	17	2	1	7	**29**
5	No Response	0	0	0	0	0	**0**
Total		**4**	**48**	**20**	**2**	**23**	**97**

Source: Socio-Economic Survey, December 2015- January 2016

During the socio- economic survey, an attempt was made to understand the broad saving potential of PAHs by calculating their income and expenditure on yearly basis. It was found that the respondentsare fully dependent on commercial activities to meet out their family needs.Since, most of them are migrants living on rented house their income from other sources are negligible. The average expenditure pattern of household constitute a major share on most necessary items like food, house rent, cooking fuel, education, electricity and transport. The details of Income and Expenditure Pattern of PAHs are given in Table 5.11 below.

Table 5.11: Income and Expenditure Pattern of PAHs Respondents under Package 1

S.No.	Average Income & Expenditure per Year					
	Income (Rs.)		Expenditure (Rs.)			
1	Agriculture	618.6	Food	27624.7	Water	84.5
2	Commercial	77618.6	Cooking Fuel	6492.8	Electricity	5501
3	Service	2391.8	Clothing	1761.9	Social Event	2010.3
4	Livestock	618.6	Transport	4889.7	Agriculture Labour	41.2
5	Remittance		Health Care	2315.5	Others (House rent and miscellaneous)	14546.4
6	Other		Education	6125.8		
	Total	**83556.7**	**Total**	**70330.9**		
Source: Socio-Economic Survey, December 2015- January 2016						

All the affected household earning their livelihood along the road side are generally found vulnerable as all of them are making a living on subsidized food provided by the Government to families below poverty line (BPLs). Amongst them, there were 8 women headed households, were also found to be vulnerable. The vulnerability status of affected households under package 1 along the Corridor of Impact is given below in **Table 5.12**.

Table 5.12: Vulnerability Status of Affected Households under Package 1

S.No	Substation	Category of Vulnerability		Total
		BPL	WHH	
1	Siripuram	4	0	4
2	Pedawaltair	43	5	48
3	MVP	20	0	20
4	LB Colony	2	0	2
5	KGH	20	3	23
6	**Total**	**89**	**8**	**97**
Source: Socio-Economic Survey, December 2015-January 2016				

An attempt was made to understand the project related awareness of respondents.It was found that all the households or persons consulted are unaware of the project REN/UG Cabling project during the survey, although some respondents expressed that it was the prerogative of the State Government to undertake any new projects for the benefit of the residents of the city.

5.7 COMMUNITY PERCEPTION ABOUT REN/UG PROJECT

Consultation with Project Affected Persons (PAPs) is the starting point to address involuntary resettlement issues, concerning resettlement. People affected by resettlement may be apprehensive that they will lose their livelihoods during the time of construction. Participation in planning and managing resettlement helps to reduce their fears and gives PAPs an opportunity to participate in key decisions that affect their lives. The first step in developing plans for consultation and participation is to identify the primary and secondary stakeholders. Information sharing is the first principle of participation. This chapter provides

details on the initial consultations carried out the affected households that lay en-route the REN/UG Cabling Project in Package-1.

Consultations were held with the impacted persons to hear about their perceptions and apprehensions of the project and to elicit suggestions from them, if any, on improvement to project design.

The project affected households were consulted individually to understand their perceptions about the project. They were asked to give their perception on the anticipated positive and negative impacts of the project. All of them perceived reduction in sufferings during natural disasters after underground cabling. Around, 50% of them expect improvement in quality of life due to the project. However, some apprehensions were also raised by the respondents in the form of loss of livelihood, access, disruption of services and undue delays for project completion. The details are presented in **Table 5.13** below.

Table 5.13: Project Impacts Perceived by the Community under Package 1

S.No.	Positive impacts perceived			Negative Impacts Perceived		
		Response Yes (Nos.)	%		Response Yes (Nos.)	%
1	Reduced sufferings during cyclones and adverse climatic conditions	366	100	Loss of livelihood	60	16
2	Improved access to services	No response		Loss of access to houses/ businesses	56	15
3	Productive use of time	No response		Loss of structures/ assets	43	12
4	Increase in business opportunity	No response		Increase in accidents during and after construction	8	2
5	Improvements in quality of life	178	49	Disruption of utilities such as water, electricity, telephone, cable, etc	78	21

Further, consultation meetings were held with the community along the project corridor at different places – namely, Religiri, ChinnaWaltair, Rajka Street, JauaraPetta Road, Polammba Temple etc. Information was disseminated about the project, its benefits and possible impacts. The apprehensions and suggestions given by community are presented below in **Table 5.14**.

The details of public consultation along with list of participants and photographs of consultation are attached as **Annexure 3.**

Table 5.14: Key Issues Raised in Community Consultations

Key Issues		
Place of Meetings	**Apprehensions raised by the community**	**Suggestions from community**
1. Polammba Temple, Pedawaltair 2. Appughar, MVP 3. Rajka Street, ChinnaWaltair 4. Ward-2, Kothagalaripeta , KGH 5. Jauarapetta Road, LB Colony 6. Riliviri Street, Chinnawaltair	• The ramps and steps will be damaged during construction resulting in loss of access • The trench and barricades will prohibit us to make a livelihood over project corridor i.e reduction in number of customer due to change of selling point. • Loss of Rs. 300 per day for all bundy(Push Cart) sellers if business is closed during construction. • In narrow streets the house door is opened directly on to the road. This may lead to accidents. • The important services like telephone, sewer, and water supply may get disrupted during construction period. • Whether the street light will be removed after underground cabling. • Whether the cost of electricity will increase.	• The ramps and steps if damaged need to be restored by the authorities under the project • Advance notice should be given to push cart/bandy owners. • As compensation, Rs. 300 per day should be given to all bandy/push cart,people if business is impacted during construction period. • Proper barricading should be done to avoid any mishap. • Utilities, if damaged during construction should be restored on urgent basis. • The street lights should not be removed. • The project is good for the city and city people • People keeping their belongings on the project corridor will be informed to remove them. • Manual digging should be done in narrow streets to minimize the impact.

SECTION 6

ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

6.1. GENERAL

This section summarizes impacts resulting from the implementation of the REN/UG project at Visakhapatnam along with the mitigation measures under the following stages of implementation:

- Impacts and mitigation measures due to location
- Impacts and mitigation measures during pre-construction stage
- Impacts and mitigation during construction stage
- Impacts and mitigation measures during operation stage

6.2. IMPACTS AND MITIGATION MEASURES DUE TO LOCATION

6.2.1. Impacts on Land use

The REN/UG cabling project, with a cumulative length of 165 kms will be laid along the existing city roads within the municipal limits of Visakhapatnam. The city roads are largely bitumen paved with sporadic stretches of cement concrete roads at some locations, particularly in narrow lanes and by-lanes. For cable laying operations, a 2m wide road stretch, in 500 metre long segments along cable route, designated as operations area/COI will be barricaded and opened up for cable laying operations. The operational areas will have footpath as one edge with the other edge extending upto 2 m on the road. In case of roads, which does not have footpath, the line of sight with trees and/or poles will serve as one edge of 2m wide of operational area, with the other edge extending upto 2 m on the road. Once the cable laying operations are completed, the damaged roads within the Operations area will be backfilled, restored to its previous state, prior to removal of barricades and moving on to next 500 meter long segment cable route. The cost of road restoration will be included in the project cost. Therefore, as a consequence of this project, there will be no change in the existing use of the cable corridor and the impacts arising are transitory in nature and limited to the cable laying operations period in a given segment. The estimated time for completion of cable laying operations for a 500 meter long segment of cable route is about 3 weeks.

6.2.2. Impacts on Fresh Water Resources

The REN/UG cable project will require water for consolidation/compaction of soil during refilling of cable trenches. Also, water will be required for dust suppression during initial site preparation, trench excavation and lastly during site clean-up operations, prior to opening up the operations area for public. The REN/UG cable projects do not require water at any other stage.

No fresh surface water sources will used for sourced for meeting the water requirements of the REN/UG project. Therefore, there shall be no impact on surface water resources of Visakhapatnam urban district as a consequence of REN/UG project implementation.

6.2.3. Impacts on Ground Water Resources

The water requirements of the REN/UG cable project is intended to be met through ground water resources (existing or new tube wells) as Visakhapatnam district is categorized under safe category. The Visakhapatnam district falls under safe category for ground water extraction according to CGWB, thus, no significant impacts are anticipated due to use of ground water for REN/UG project. In any case, the estimated water requirements are about 6000 litres for a 1000 metre long segment of cable route, which is very minimal as compared to any other construction project requirements.

The REN/UG Cable project does not involve any operations, which lead to generation of effluents/emissions that may directly or indirectly impact either surface and/or ground water resources. All other operational areas for the REN/UG cabling project like store yards, which are likely to have potential for pollution, if any will be provided with impermeable surfaces to avoid soil, surface water and/or and ground water contamination.

6.2.4. Impacts on Soil and Geology

The REN/UG cable project will be constructed along the existing bitumen and/or cement concrete roads, within the municipal limits of Visakhapatnam. The depth of cable trenches does not exceed 1.5 meters from existing road levels. The roads will be restored to its previous state after cable operations. Under this project, no top soil will be disturbed or any virgin areas/land will be opened up for cable laying operations and therefore, the REN/UG cable project will not have any impacts on soil and geology of the area.

6.2.5. Impacts on Flora and Fauna

The REN/UG cable project will be constructed along the existing roads within the city limits of Visakhapatnam. The road side trees along the cable route will be excluded through minor realignments, while delineating the operational area/corridor of impact. Therefore, the REN/UG project will not impact on the flora. However, lopping of trees may be required in order to facilitate mechanical excavation (boom movement) at some specific stretches/locations. Necessary permissions will be obtained for lopping of trees, if any required or alternatively, even manual excavation will be resorted to avoid lopping of trees. During trench excavation, utmost care shall be taken to avoid damage to the root zone of trees, irrespective of its size.

As the REN/UG project is limited to existing city roads, impacts on fauna is not anticipated.

6.2.6. Impacts on Weather and Climate

The REN/UG cable project will not cause any emissions that can impact local weather and climate. On the Contrary, the project will passively avoid CO_2 emissions through efficient power distribution network. Also, the project component does not involve large scale construction activities like area development or industrial or other infrastructure development projects, which can have some impacts on the local climate.

6.2.7. Impacts on Archaeological/Historical Monuments

There is no important excavation site(s) listed by the Archaeological Survey of India within the proximity of the cable outs considered under this package. Also, no UG cables will laid within 100 metres of any protected monument. However, given that REN/UG cable project implementation will involve excavation works (limited to a maximum of 1.5 metre) and in an unforeseen and unlikely scenario of sighting of remnants or chance finds, the matter will be

immediately brought to the attention of the State/Central Department of Archaeology. All further work at the specific location will be carried out only after the site is cleared by the Archaeological Department.

6.2.8. Impacts on Ecologically-Sensitive Areas

There are no ecologically-sensitive, protected areas and important bird areas (IBA), which are proximate or along the REN/UG cable project. The REN/UG project is limited to city roads and therefore will not cause any adverse impacts to ecologically-sensitive areas or IBAs.

6.2.9. Impacts on Wetlands/Surface Water Bodies

The REN/UG cabling project is neither in proximity of any wetlands/surface water bodies or dependant on any wetland or natural surface water bodies for meeting its fresh water requirements. The water requirements of the project will be met through the existing and/or new tube wells as the Visakhapatnam district is categorized as safe for ground water extraction by CGWB. Thus, the project will not cause any adverse impacts on the wetlands/local surface water bodies.

6.3. GREENHOUSE GAS (GHG) EMISSIONS

The Project will not contribute to CO_2 emissions but instead passively will avoid CO_2 emissions through efficient power distribution network.

6.4. HAZARD RISK AND VULNERABILITY

The REN/UG cable project is spread across Visakhapatnam city, which falls under a low risk seismic zone (Zone II). Further, project does not involve any structures, which are above the ground level and therefore does not warrant earthquake resistant designs. On the contrary, the REN/UG cable project is being constructed in order to have a resilient electrical network as a counter measure to the damages, which occur during and after cyclones. However, REN/UG cabling project could be stalled for brief periods, in case of any occurrence of cyclones during the implementation phase.

6.5. IMPACTS AND MITIGATION MEASURES DURING PRE-CONSTRUCTION STAGE

6.5.1. Regulatory Requirements

The REN/UG cable project is not within the purview of the MoEF's EIA notification, 2006 and therefore will not require prior environmental clearances either from CPCB or APPCB. The construction camps or crusher units established, if any under the project by the contractors will require Consent to Establish (CTE) from APPCB under Water (Prevention and Control of Pollution) Act, 1974 and Air (Prevention and Control of Pollution) Act, 1981 prior to commencement of construction activities.

Considering the insignificant requirements of concrete and or bitumen, it is very unlikely that the contractors under the project will establish any crusher units/large scale bitumen mix plants or construction camps. The establishment of labour camps also may not be warranted as they are likely to be drawn from surrounding areas on a daily basis. Therefore, the CTE and CTO requirements may not normally apply and the same will be obtained by the Contractor, if becomes applicable. While issuing consents, APPCB may ordinarily stipulate conditions, which are to be adhered to during the entire construction phase and submit a compliance statement periodically. Thus, ensuring compliance to consent conditions (in applicable case) will ensure minimizing potential adverse environmental impacts resulting

from project implementation as well as conformance to regulatory requirements.

6.6. IMPACTS AND MITIGATION MEASURES DURING CONSTRUCTION STAGE

REN/UG cabling project construction activities will primarily involve site clearance, site preparation, barricading, trench excavation, cable pullout, lowering, jointing, trench refilling and road restoration works, all of which are largely confined to the respective 2 metre wide operational barricaded area(in 500 metre long segments), which will be opened up for cable laying. Other than this, the REN/UG cable project will have store yards at 3 or 4 locations across city (to be made available by PIU, APEPDCL), which is primarily intended to serve as store yard for cable coils and other materials required in the construction of REN/UG cable project. Such store yards will enable to avoid on-site storage (to extent possible) and disruptions to pedestrians as well as vehicular traffic at respective work sites.

6.6.1. Site Clearance and Preparation

Although, the REN/UG project will not involve clearing of shrubs and vegetation but still will require clearing of unwanted materials, if any as to ensure entire barricaded operational area is available completely for cable laying operations.

Concurrently, certain site preparation activities will need be carried out like informing the local residents/occupants of building, putting up diversion or caution notice boards for both pedestrian as well as vehicular traffic at appropriate locations, creation of temporary access across barricaded areas, as may be required, carrying out minor leveling (including minor repairs to make it even) of footpath along side of barricaded area, so as to ensure pedestrian safety as a result of diversion. Additionally, trained traffic wardens with reflective jackets are to be deployed at places, wherever barricaded operation areas are close to road intersections in order to ensure smooth movement of traffic. All cleared/removed materials from the barricaded operational areas are to be disposed off in GVMC approved locations for disposal of construction debris.

6.6.1.1. Impacts

Site clearance operations may cause increased dust and noise levels locally in and at around the barricaded operations area. Access to buildings across the barricaded operational area might be slightly impacted.

6.6.1.2. Mitigation Measures

The 2 metre wide area in 500 metre long segments along cable routes designated as operational area/COI have to be barricaded, with access at intermediate locations as may be required. The Central Public Works Department (CPWD), GoI has standard designs and specifications for barricading construction sites. These standard designs and specifications will be adhered to under REN/UG cable project. The barricading of the operational area itself will limit the disturbances or construction impacts on the local residents. The work force involved in site clearance operations shall be provided with personnel protective equipment (PPE) like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily. The dust levels can be controlled, through water tankers fitted with sprinkling arrangements for a pressurized fine spray, prior to start of clearing operations in batches. Use of well-maintained and less than 5-year old earth excavators/moving equipment will enable to limit the noise levels to a large extent.

6.6.2. Excavation Works

The REN/UG cable project will involve trench excavation using mini excavators/ skid steer loaders like chain mounted Bobcat model E26 or Wheel mounted Vectra- model HEMAN 175 or wheel mounted model-JCB 155, trenchers, among others. Such mini excavators are especially designed and suited for excavations within limited operational areas and are commercially available with options for different attachments suited for operations like for rock breaking, trenching, cable pulling, earth back filling and compacting operations. The trench excavation shall strictly confirm to required width and depth as per designs and pre-determined levels required by Project design.

6.6.2.1. Impacts

Trench excavation works will either result in disposal of excess excavated material; particularly the excavated road cut bitumen and /or cements concrete road materials. The good earth, scavenged from excavation operations, if any can be stored aside, within barricaded areas for backfilling of trench. The disposable excavated materials including the bitumen and /or cement concrete road materials and all other road cut materials needs to be disposed off in GVMC approved locations.

Trench excavation operations may induce increased dust and noise levels locally in and at around the barricaded operations area/COI but these impacts will be limited to operational hours only.

Trench excavation operations needs to be carried out due diligently in order to avoid damage to any other underlying utilities like water supply, sanitary pipes, telecom cables, OFC cables or any other pre-existing similar utilities.

Trench excavation may also require removal of ramps and/or steps at certain locations. Also, trench excavation may restrict free access or may cause hindrance to access to private and/or public buildings across the barricaded operational areas/COI.

Ordinarily, trench backfilling operations will not require any fresh earth as per project design but fine sand will be required, which will be sourced from sand mining operators, licensed by the Department of Mines, Government of Andhra Pradesh.

6.6.2.2. Mitigation Measures

Similar to site clearance activities, all the work force involved in earth moving and leveling operations shall be provided with PPE like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily.

The personnel involved in the onsite operations and exposed to noise levels for prolonged duration shall be provided with short breaks, so as to limit their exposures.

Dust levels during excavation/backfilling operations can be controlled through periodical sprinkling of water through tankers with pressurized fine spray. Ensuring availability of at least 1 tanker of 6000 litres capacity for every (2x500m) 1000 meters long segment and the deployment of well-maintained and less than 5-year old vehicles and earth moving equipment, dozers and rollers will minimize noise generation at the project construction site.

Any damage to pre-existing utilities are to be restored within shortest possible period and a grievance redressal mechanism needs to be established for attending complaints as a result of disruptions caused by trench excavations.

Although trench excavations may involve removal of unauthorized ramps/steps, but all such ramps, steps and other infrastructure shall be restored to its previous state and temporary access across barricaded area shall be provided as an interim measure.

6.6.3. Cable Pullout, Lowering and Jointing

Once the trench excavation is completed to required dimensions, cables (as per required sizes and configuration) needs to be pulled out from cable coils through same mini excavators used for trench excavation. Once the cables are pulled out and lowered into trenches as per project design requirements, jointing of the cables are to be completed.

Since the operational area/COI has been carved out of existing busy roads, cable lowering, jointing and backfilling can cause disruptions to both pedestrians and vehicular traffic apart from disruptions in access to buildings.

6.6.3.1. Impacts

The impacts of cable pullout, lowering and jointing operations are very limited and do not contribute to increase in ambient dust and/or noise levels. However, these operations can pose safety risks to both workforce as well as to public, if adequate precautions are not taken.

6.6.3.2. Mitigation Measures

The cable pull out, lowering and jointing operations can pose safety concerns and therefore all work force deployed in operations shall be properly trained, and provided with all required PPEs like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily. The personnel, who are exposed to high noise levels, shall be provided with short breaks. The barricaded operational areas shall be access controlled and barred for entry by un-authorized persons from public safety point of view.

6.6.4. Backfilling of Cable Trenches

Once the cable lowering, jointing of cables as per project design is completed, the trenches are to be back filled with find sand as per project design. The sand could be sourced from sand mining operators, licensed and approved by the Department of Mines, Government of Andhra Pradesh. The scavenged good earth from the excavation operations stored within operational areas will also be reused. The back filling operations will also require consolidation and compaction of backfilled earth layers, so as to create a firm base, prior to taking up road restoration. During consolidation and compaction, watering of the backfilled earth layers will be required for better consolidation and compaction. The compaction of earth layers can be carried out by mini excavators used for earth work excavation.

6.6.4.1. Impacts

The trench backfilling operations do not cause any on site impacts. However, there could be off site impacts, if the sand is not being sourced from unauthorized sources. The consolidation and compaction of earth layers during backfilling operations will require water, which is to be provided through periodical sprinkling of water through tankers with pressurized fine spray. Ensuring availability of at least 1 tanker of 6000 litres capacity for every (2x500m) 1000 meters long segment will suffice requirement and deployment of well-maintained and less than 5-year old vehicles and earth moving equipment and rollers will minimize noise generation at the project construction site.

6.6.4.2. Mitigation Measures

The sand shall be sourced from only licensed and approved operators from the Department of Mines, Government of Andhra Pradesh. The water usage for consolidation and compaction will not require significant quantities and can be sourced from existing tube wells. The Visakhapatnam falls under the safe category for ground water extraction and therefore this does not pose any risks, which require further management. Other than this, all workforce shall be properly trained and provided with all required PPEs like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily. The personnel, who are exposed to high noise levels, shall be provided with short breaks. The barricaded operational areas shall be access controlled and barred for entry by un-authorized persons.

All excess materials including debris generated from the trench backfilling operations are to be collected and reused in other segments, if found suitable or disposed off in approved locations by GVMC. Since the work is being carried out along roads in commercial as well as residential areas, utmost attention has to be exercised to swiftly complete all operations including road restoration, prior to opening up the barricaded area for public use with shortest possible time. It is anticipated that about 3 weeks of time will be required to complete a 500 meter long segment of cable route from start to finish prior to moving onto next 500 metre segment of cable laying.

Prior to vacating the barricaded area, all road side outlets to storm drains alongside of barricaded area are to be checked for blockages and if found any are to be cleared, so that road drainage will not be affected aftermath of cable laying operations.

6.6.5. Road Restoration Works

After the completion of the trench backfilling, consolidation and compaction of back filled earth in layers, road restoration works (for either bitumen and /or cement concrete roads as the case may be) are to be taken up as conforming to specifications specified by GVMC.

6.6.5.1. Impacts

The road restoration works is likely to cause impacts like increase in noise, dust levels, odour for brief periods and limited to brief phase of road restoration. The impacts of road restoration could be due to setting up and operation of bitumen mix plants and/or concrete mix plants and handling of bitumen, cement, sand, stone aggregates along with batch mixing operations for bitumen/concrete production.

6.6.5.2. Mitigation Measures

The bitumen mix plants can be set up within the areas earmarked for storage yards for inventory for REN/UG cable project. The impacts due to these operations are generally transitional in nature and quickly dissipate, once the operations are over. In case of concrete roads, even these transitional impacts can be controlled through sourcing and use of ready mix concrete, brought to the site through transit mixer(s) from a ready mix plant (RMC) located elsewhere. Such commercially operating ready mix plants supply concrete as per desired grade requirements and are available in Visakhapatnam.

Considering the required concrete volume and availability of the ready mix plants in the Visakhapatnam area, it will be economical and convenient to use the ready mix concrete in place of batch mixing of concrete on site, notwithstanding such decision will be the

prerogative of the EPC contractor, unless use of ready mix concrete is stipulated as a requisite in the specifications of contract/bidding documents.

The impacts due to concrete mixing operations can almost be avoided through use of ready mix plants. However, concrete shall be sourced only from RMC plants having valid consents and permission or authorization of APPCB. In case of onsite batch mixing operations are adopted for concrete production, the stone aggregates and sand shall be sourced only from licensed/approved quarries, having valid consents/authorization from APPCB.

6.6.6. Opening of Operational Area/COI for Public Use

The barricaded operational area in 500 metre long segments are to be opened up only after the road restoration works are completed as per GVMC specifications, without leaving out any areas unpaved or uneven levels between old and new surfaces. Care shall be taken to match the levels of old and newly restored surfaces, so as to have an even surface after restoration. The area is to be thoroughly cleaned for all debris, either usable or un-unsable materials. All unwanted materials are to be collected and disposed in approved locations by GVMC.

6.6.6.1. Impacts

The impacts from these operations could be in the form of increased noise levels, dust levels, wastes and rejected materials for disposal or construction debris etc. limited to the barricaded areas only under normal circumstances. Other impacts could be blockage of drainage out lets along road side of the barricaded operational area, left out unpaved areas or uneven surfaces between old and new surfaces among others.

6.6.6.2. Mitigation Measures

Care shall be taken during the road restoration works so as not to leave out any areas unpaved within the operational area and bordering the operational areas. Also, care shall be taken to match the levels of old and newly restored surfaces, so as to have an even surface after restoration. The area is to be thoroughly cleaned for all debris, either usable or un-unusable materials. All unwanted materials are to be collected and disposed in approved locations by GVMC. All drainage outlets into storm drains along barricaded area are to be checked for blockages, if any and cleared. The barricaded area shall be opened up only after ensuring these measures.

The dust levels, during the cleanup activities of operational are to be controlled through sprinkling of water through water tankers fitted with pressurized fine spray. Similarly, use of well-maintained and less than 5-year old vehicles and equipment will enable to limit the noise levels. All the work force involved in the operations shall be provided with PPE like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily. The personnel, who are exposed to high noise levels, shall be rotated atleast once in pre and post-lunch sessions, so as to provide short breaks.

6.6.7. On site Workforce

The preparation of site, trench excavation, cable lowering, jointing, back filling including consolidation and compaction of trenches, road restoration, site cleanup will require both skilled and un skilled workforce. The work area being within city limits, all workforce is expected to return to their places of residence after work shift hours. For out station workforce, if any the contractor shall provide rented residential accommodation with water,

sanitation and allied facilities for comfortable stay.

It shall be mandatory for all workforce, irrespective of level, to wear personnel PPE like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily, while on work. The personnel, who are exposed to high noise levels, shall be provided with short breaks.

6.7. Impacts and Mitigation Measures during Operation Stage

6.7.1.1. General

The commissioning and operation stage of the REN/UG cabling project will not involve any activities that will have environmental impacts. However, once the REN/UG cabling project has been commissioned, the existing over head distribution system needs to be dismantled. The existing over head infrastructure, which is to be dismantled, is given in Section 3. All serviceable materials will be re-deployed elsewhere and unserviceable materials will be disposed off as scrap by APEPDCL. The serviceable materials will be stored at APEPDCL's existing yards. The transformers, which have potential for leakage of oils/lubes, shall be stored on impermeable surfaces areas within store yards prior to redeployment or disposal as scarp, as the case may be. All such impermeable surfaces shall be either be covered or provided with separate storm water drainage system, which will be further diverted to the municipal sanitary system.

6.7.1.2. Impacts on local people and conflicts

The Project will provide skilled and unskilled employment opportunities largely to the local people. The work area being within city limits, all workforces is expected to return to their places of residence after work shift hours. For out station workforce, if any the contractor shall provide rented residential accommodation with water, sanitation and allied facilities for comfortable stay. Since, no work force camps are envisaged to be set up under the project and largely locals will be employed, no social conflicts are foreseen as a result of this Project.

7.1. GENERAL

The social impacts of the REN/UG cable project are summarized under this section. The social surveys carried out by the consultants between 22 December 2015 to 20 January 2016 and subsequent social impact assessment has revealed that the REN/UG cabling project is likely to trigger pre-dominantly (a) Temporary loss of access to residential and commercial buildings and (b) Temporary impact on livelihood of squatters.

7.1.1. Impacts on Land

REN/UG cabling sub-project will be implemented within existing RoW of city roads, limited to 2 metre wide corridor of impact. The road/land belongs to GVMC, under the State Government and hence no private land is required to be acquired and all roads are presently under public use. Consequently, not a single titleholder is found to be impacted due to land acquisition under this component of APDRP.

7.1.2. Impacts on Structures

Temporary Loss of Access: The survey has revealed that both residential and commercial structures along the roads (within a 2 metre wide corridor of impact/operational area along UG cable route alignment) have direct access on to the road. In order to gain direct access, building owners have constructed ramps and /or steps from plinth level of their building(s) to road level (sometimes even over road side drain) to ensure easy vehicular or pedestrian movement from building to road (ref **Figure 7.1**).

During survey it was revealed that around 2032 ramps, 139 steps and 140 other structures will either partially or fully impacted during excavation of cable trench excavation for UG cables. The structures under other category include base of hand pump/water tank, part of small walls of extended shops, signboards, boundary walls of public utilities, etc. The details of structures, which are likely to be impacted during cable excavation is given in **Table 7.1**.

Table 7.1: Details of Structures likely to impacted under Project-Package 1

S No.	Substation Area	Type of Structures					
		Ramp		Steps		Others*	
		No.s	Area (Sq.mt.)	No.s	Area (Sq.mt.)	No.	Area (Sq.mt.)
1	KGH	176	782.75	21	26.3	9	46.2
2	LB COLONY	272	1269.6	14	7.28	10	50.7
3	SIRIPURAM	106	1161.3	4	10.12	19	173.4
4	PEDAWALTAIR	397	2013.9	48	109.2	41	268.9
5	MVP	1081	5302.8	52	112.97	61	413.3
6	**Total**	**2032**	**10530.35**	**139**	**265.87**	**140**	**952.5**

Source: Socio-Economic Survey, December 2015- January 2016
*Note: * Indicate other structures like base of hand pump, water tank, part of small walls of extended shops, signboards, boundary walls of public utilities etc.*

Figure 7.1: Survey of Impacted Ramps

Though, ramps and steps of buildings are illegal and have been constructed by the owners at their own risk, many of these are likely to get damaged (either fully or partially) during the trench excavation works for underground cabling. The entitlement matrix under ESMF for APDRP provides relief for such building owners (both commercial and residential) and thus they become eligible to get assistance at replacement cost for their impacted structures. The replacement cost will be estimated and included in the ESMP along with a provision for providing temporary access to all such buildings during REN/UG cable project implementation.

7.1.3. Impacts on Livelihood

The survey also indicated that there are appreciable numbers of ambulatory vendors at some selected stretches/locations along the roads (incidentally also UG cable route alignment). Many of these vendors change their locations to 2-3 times per day to cover more areas for maximizing their business activities. During the excavation works for underground cabling laying, they are unlikely to get directly affected as they can temporarily shift to nearby locations and continue with their business and thus they are unlikely to lose their livelihood due to UG cable laying.

The consultations held with such ambulatory vendors indicated that they do not hold this issue as serious and indicated that given some advance notice, they can temporarily shift to some nearby locations for the period of construction and relocate back, once cable laying activities are completed. However, few of them, who have occupied a particular location over a period of time and are found more or less stationary envisaged loss of their income

during period of construction. During the consultations, such vendors expressed that they anticipate a loss of Rs. 300 per day.

In addition to the ambulatory vendors, many stationery kiosks of squatters within the COI have been observed during the surveys. All such stationary kiosks, which are likely to be affected due to the REN/UG cable project, were surveyed, consulted and enumerated for estimating the required assistances as per the entitlement matrix under APDRP. The details of impacted structures of stationery kiosks of such squatters are given in **Table 7.2**.

Table 7.2: Category wise details of Squatter's Structures, impacted under -Package 1

S No	Category of Structure	Substation wise No. of Structures					Total
		SIRIPURAM	PEDAWALTAIR	LB COLONY	KGH	MVP	
1	Tiffin/Tea Stall	1	5	0	0	2	8
2	Dhobi/ Cloth Iron(press) Shop	0	2	0	1	6	9
3	Grocery(Kirana)/General Store	0	1	0	0	1	2
4	Vegetables/ Fruits Vendor	0	21	1	9	0	31
5	Tailor shop	0	2	0	1	7	10
6	Pan/ Cigarette Shop	2	9	1	8	1	21
7	Mechanic Shop	0	2	0	3	1	6
8	Curry/Eatery outlet/food stall	0	3	0	0	0	3
9	Barber Shop	0	1	0	0	0	1
10	Cobbler/ Shoe Maker	0	0	0	0	0	0
11	Butcher/meat Stall	0	1	0	0	1	2
12	Kabadi/Scrap Shop	0	0	0	0	1	1
13	Stick Vendor /shop	1	0	0	0	0	1
14	Juice Vendor/Shop	0	1	0	1	0	2
15	**Total**	**4**	**48**	**2**	**23**	**20**	**97**
Source: Socio-Economic Survey, December 2015- January 2016							

The census and socio- economic surveys of squatters likely to be impacted due to REN/UG project indicated that a total of 97 squatters, which will also entail some 366 PAPs(as documented during surveys) will be impacted temporarily during the time of cable laying under REN/UG project. The sub-station wise details of squatter's likely to be impacted are given in **Table 7.3.**

Table 7.3: Substation wise details of Squatter's impacted under -Package 1

S.No	Substation	No. of Affected Squatters	No. of PAPs
1	Siripuram	4	18
2	Pedawaltair	48	180
3	MVP	20	84
4	LB Colony	2	8
5	KGH	23	76
6	**Total**	**97**	**366**
Source: Socio-Economic Survey, December 2015- January 2016			

Selling of Fruits on Push Cart (Bandy) **Iron (Dhobi) Shop along the Project Corridor**

7.2. RESETTLEMENT ACTION PLAN (RAP)

A RAP has been prepared to deal with all resettlement issues arising out of the REN/UG cable project in accordance with the ESMF provisions of APDRP. The RAP includes an analysis of the impacts, identification of nature and types of losses, and establish an entitlement for compensation and resettlement benefits as per the provisions made under ESMF, APDRP. The RAP is provided in a separate volume, which may be referred for further information.

SECTION 8
ANALYSIS OF ALTERNATIVES

8.1. GENERAL

This section presents an analysis of alternatives considered in the project prepration to avoid or minimize both environmental and social impacts that would be inevitable, if technically optimal cable route alignment is followed. An analysis of various alternatives has been carried out prior to arriving at the technically best with minimal environmental and social impacts.

The main issues along the Operations Area/COI along cable routes are the physical obstacles like unauthorized ramps/steps of private and/or government buildings, which have been extended on to roads for ease of access, existing telecom and electricity poles, road side trees among others. The other issues are disruptions to public utilities, safety to pedestrians as well as road users apart from work force, who are directly involved for cable laying operations. The social issues due to the UG cabling project are;

- Temporary loss of access to residential and commercial buildings
- Temporary impact on livelihood of squatters/street hawkers/vendors.

The route alignments considered in the REN/UG cabling project (as indicated in Section 3) is flexible and therefore this factor has been used to avoid most of the impacts within the Operations Area (OA)/Corridor of Impact (COI).

8.2. WITH OR WITHOUT PROJECT SCENARIO

The ‘with’ and ‘without’ project scenarios are analyzed with respect to the development of the state by the backdrop of requirement of resilient electrical distribution infrastructure for sustained growth economy and consequent well-being of its citizens in the aftermath of cyclones/natural disasters.

The ‘with’ scenario of the REN/UG cabling project is expected to provide a resilient electrical network even if the coast of Visakhapatnam is struck with another cyclone/natural disaster, like the Hudhud in October 2014. The REN/UG cabling project is expected to minimize the miseries of people at large, minimize the damages to public and private property, help the state to handle the after effects of natural disaster(s), which the coastline of Andhra Pradesh, including Visakhapatnam stands exposed and most importantly help the state economy recover faster in the aftermath of natural disasters. The project also helps to upgrade the existing over head network to construct an upgraded underground electrical network, which can cater to the projected power demand as of year 2025-2030.

The main objective of this component under APDRP is the conversion/replacement of all existing over head electrical network into underground cabling network so as have a resilient electrical network (REN), which can stand the vagaries of cyclones and reduce/prevent the miseries of people and resources for reconstruction including helping the state economy to recover faster in the aftermath of natural disasters.

If the REN/UG cabling project is not implemented, there is every likelihood that the existing over head electrical network within Visakhapatnam will stand exposed to damages and destruction that comes along with the cyclones, the last being the Hudhud in October 2014. Moreover, existing OH electrical network would need investments for up-gradation to meet increasing power demand of Visakhapatnam in the coming years. Any further investments

on the existing OH electrical infrastructure can't be justified, given the looming threat of cyclone disasters and the damages that comes along with that.

Therefore, the "with" project scenario, with its minor adverse impacts is more acceptable than the "without" project scenario which would mean an aggravation of the existing problems. Potential benefits of the proposed REN/UG cabling project are substantial and far-reaching in order to achieve all-round development of the State economy and progress for its people.

8.3. CABLE ROUTE ALTERNATIVES

The project preparation has considered several options/alternatives, during the finalization of the route alignment of the REN/UG project. The factors, which were considered included most optimal cable length, avoid or minimize relocation/shifting requirements of existing utilities along route alignment, avoidance of trees, which require felling, avoid or minimize road crossing points, minimum diversions to traffic as well as pedestrian traffic among others.

Any route alternatives, without considering optimal cable length, relocation/shifting requirements of utilities, avoidance of trees, minimum diversions of pedestrian and vehicular traffic will cause severe disruptions not only for project implementation but also for vehicular and pedestrians traffic, since cable routes are all spread across Visakhapatnam city's busy main roads to lanes and by-lanes.

8.4. 'OPERATIONS AREA' ALTERNATIVES

The project preparation has proposed four configurations of cable laying, but with a uniform trench width of 1 meter and varying depth in all cases under the project. In order to minimize disruptions to both pedestrian as well as to vehicular traffic, it is utmost necessary to limit the area of operation required for trenching, cable pullout, lowering, jointing, prior to refilling and restoring trench to its previous state and at the same time ensure minimum working space is available for completing work in a timely manner.

In order to limit the area of operations, several cable trench excavation methods were assessed for minimal operations area requirement and a 2 meter wide corridor as 'operational area or corridor of Impact' along the footpath, has been considered, which are to be opened up for cable laying operations in 500 meter long segments. The 2 metre wide corridor in 500 meter long segments is to be barricaded on both sides considering the following;

- The corridor of impact/operations area will be along footpath, with footpath/kerb being one edge, and other edge of corridor extending on to road up to a maximum of 2 m.
- In case of roads which do not have foot paths, the line of sight with trees/poles shall be considered as one edge of the 2 m wide corridor and other edge of corridor extending on to road up to a maximum of 2 m.
- The 2 meter wide corridor of impact/operations area is to be barricaded on both sides in 500 meter long segments along cable alignment with provision for temporary access at regular intervals to cross over across barricaded area for pedestrians as shown in **Figure 8.1**.

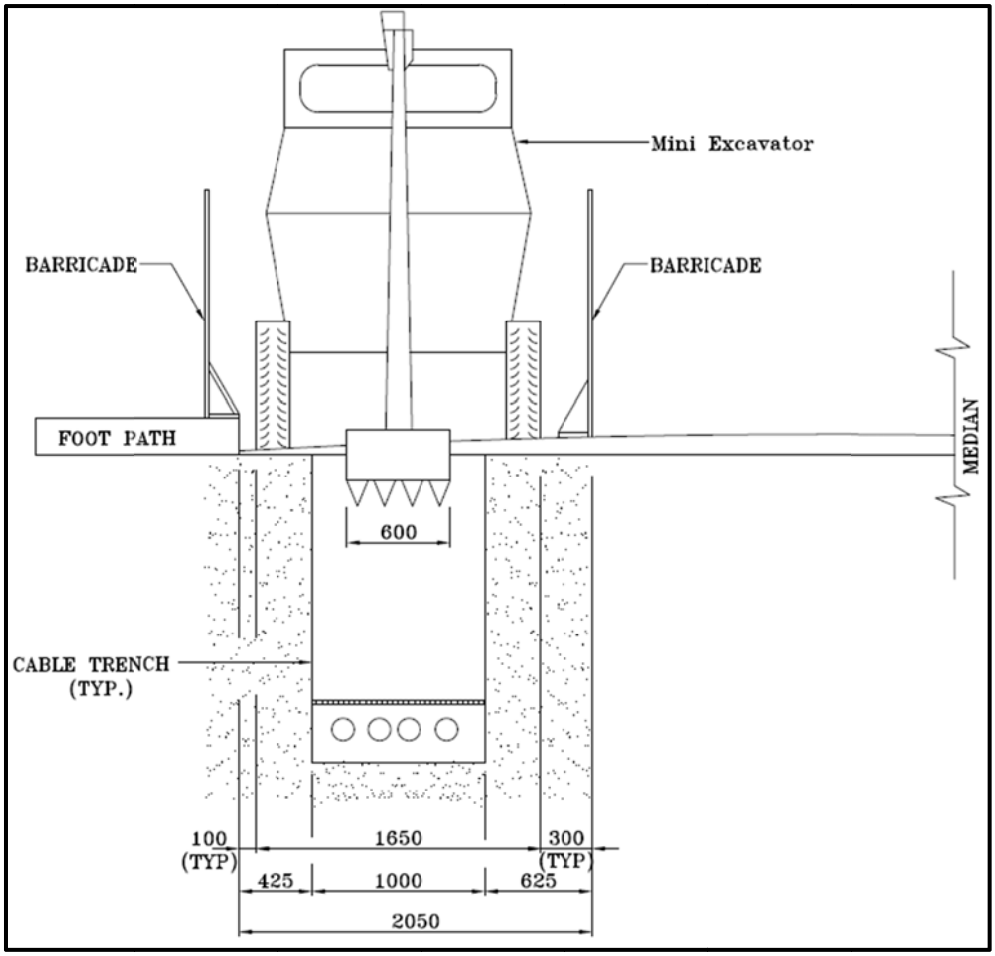

Figure 8.1: Corridor of Impact/Proposed Operational Area for trench Excavation

- Within the barricaded operational area, 1meter wide cable trenches are to be excavated using mini excavators/ skid steer loaders like chain mounted Bobcat model E26 or Wheel mounted Vectra- model HEMAN 175 or wheel mounted model-JCB 155, trenchers, among others. Such mini excavators are especially designed and suited for excavations within limited operational areas and are commercially available with options for different attachments suited for operations like for rock breaking, trenching, cable pulling, earth back filling and compacting operations.
- The mechanical excavations are to be essentiality supplemented by manual excavation at some places in order to maneuver minor obstacles within the barricaded operational area like kerb/road side small trees/saplings, telephone/electric poles, which will otherwise require shifting or removal for movement of excavators, if mechanical means of excavation is to be adhered all through the alignment.
- Other operations like cable pull out, lowering, refilling of trenches, removal of excess earth, compacting of backfilled earth etc can be done by using the same mini excavators, with additional accessory attachments. Thus, no operations related to cable laying work is ordinarily expected to spill out on to either footpath or the road, outside the barricaded area.
- The operational areas can be moved ahead in 500 meter long segments, once all required cable laying operations are completed including restoration of trenched area to its previous state as required/specified.

- The contractors shall be provided with adequate open areas(at least two to three locations per package) to store inventories like cable rolls, cement concrete slabs, earth/sand for refilling, cement concrete batch mixers for restoration of trench area among others. The provision of open areas for inventories will minimize disruptions to vehicular /pedestrian movement near barricaded operational areas and avoid unwarranted storage of construction materials on roads.
- The barricaded areas in each segment shall be provided with fixed exit and entry points for bring in required inventories and taking out debris or disposables out of the operations area.
- The operational areas can be either on left or right side of the road depending upon of the cable route alignment considered in the project preparation.

In case, excavations are to be carried out using standard/full size excavators, the corridor of impact or required width of operations area required will be at least 3.5 m, which will further reduce the available lane space for traffic movement and can lead to disruptions to vehicular traffic.

Alternatively, if corridor of impact/operations area is to be limited to bare minimum, even then, required width will be 1.6 m and in such case trench excavation needs to be carried out through manual excavation. In case manual excavation is adopted, other operations like cable pull out; lowering into trenches will spill out on to roads and outside the barricaded area for limited periods during cable laying, which can lead to traffic disruptions. The manual excavation may be essentially required in narrow roads, where LT cables are required to be laid. Also, manual excavation of cable trenches for the entire UG cabling work will be time consuming and prolog the implementation of project.

SECTION 9
ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

9.1. GENERAL

This section summarizes an environmental and social management plan (ESMP), which include the measures for avoiding or mitigating the environmental and social impacts, likely to occur during the REN/UG project implementation

The section also includes the budgetary provision required for implementing the ESMP and Institutional Arrangements for implementing and monitoring the ESMP.

9.2. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

The envisaged Environmental and Social Management Plan during the implementation of REN/UG project is given in **Table 9.1**. The ESMP includes role and responsibilities of PIU and EPC contractors in planning and implementation of suggested measures in the ESMP.

9.3. BUDGETARY COSTS FOR ESMP IMPLEMENTATION AND MONITORING

The implementation of ESMP during pre-construction, construction stages of REN/UG cabling project largely constitute good engineering and construction practices and therefore many of the measures can be considered as incidental to works. However, some measures are to be provided as an additional requirement to mitigate or avoid environmental, social and safety concerns during the implementation stage of REN/UG project. The summary budgetary cost for all such measures is estimated to be **INR 10 crores** and is given in **Table 9.2.** A detailed breakup is given in **Annexure 4.**

The ESMP along with the estimated cost provisions are to be integrated in the EPC contract/ bidding documents as **MANDATORY CONTRACTUAL OBLIGATIONS** and contractual payments are to be linked to satisfactory compliance to implementation of ESMP provisions. Thus, the EPC contractor is expected to be fully conversant with the ESMP requirements of REN/UG project and make his own cost provisions for ESMP at the bidding stage itself.

Table 9.1: Environmental and Social Management Plan (ESMP) for REN/UG Cable Project – common all packages at Visakhapatnam

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
PRE- CONSTRUCTION STAGE				
1	Orientation for EPC Contractor	• Conduct briefing and/or orientation for EPC Contractor on ESIA requirement and compliance to ESMP provisions, grievance redress mechanism for both social and environmental issues, public safety aspects at work place, ESMP monitoring and reporting requirements under the project • Briefing shall include strict compliance against child labour, bonded or forced labour, minimum wages and awareness about sexually-transmitted disease such as HIV/AIDS to prevent potential incidence. • Requirement of mandatory induction training requirements by Contractor for workforce, at all levels (including induction training and/or orientation for new entrants and/or different disciplines throughout construction phase) covering the ESIA and ESMP requirements of the REN/UG Project • To record and maintain Safety at workplace & Fatalities of all types, particulars of public utilities damaged/restored, grievances received/resolved and any other matter of relevance to ESMP, detailed below	PIU-EHS	PIU-EHS, Independent 3rd Party agency appointed by PIU under overall directions of PIU-Site In charge (at Package level) and PIU Head
2	EPC Contractor's responsibility for implementation of environmental and social management plan (ESMP)	• EPC contract shall include adherence to ESIA/ESMP requirements and compliance to the ESMP as conditions of the contract under the REN/UG project. • EPC Contractor shall prepare package specific environment; health and safety (EHS) Checklists for all operational areas to cover all relevant ESMP itmes for a Specific cable route segment opened up for cable laying operations and get its prior approval from PIU-EHS • EPC Contractor shall provide all required resources like staff, equipment, budget for effective implementation of ESMP in letter and spirit. • All ESMP implementation activities of EPC Contractor at Project site shall have the prior approval of PIU-EHS • All work force deployed at Project site shall be oriented about EHS practices/requirements, specific to this project and provided with personnel protection equipment (PPE) like safety helmets, face masks,	EPC –EHS	PIU-EHS, and Independent 3rd Party agency appointed by PIU under overall directions of PIU-Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		ear plugs, protective gear with reflective jackets and safety shoes, and its use will be mandatory. • Work force exposed to high noise levels (beyond 70 dB) shall be provided one break each in pre and post lunch sessions • Contractor shall only deploy well-maintained and less than 5-year old earth-moving equipment, excavators/compactors, rollers, etc. to minimize generation of noise at construction site/work areas. • EPC Contractor shall comply with all the requirements for safety of the workforce set forth by the GoI and Andhra Pradesh including the adoption of best industry practices. • EPC Contractor shall set up a first aid unit with adequate supply of materials and equipment in every work zone as per the Factories Act and Rules. • EPC Contractor shall preferably have have arrangements with nearby hospitals for attending any fatalities/injuries to workforce at site.		
3	Compliance to the requirements of APPCB prior to construction	• Consent to Establish and Consent to Operate (CTE & CTO) shall be obtained, in the unlikely event of contractor intending to set up concrete batching plants/ bitumen hot mix plants under the project. • No batching plants/bitumen hot mix plants/yards are to be set up or operated by contractor prior to obtaining the CTE and CTO from APPCB.	EPC-EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
4	Allocating/earmarking areas for material stacking (material stacking yards)	• PIU in consultation and requisite approvals from GVMC shall identify suitable lands, which can be used as material stock yards by the EPC contractor during construction phase • Earmarked stack yards will enable contractor to use minimal area at work site/operational areas for cable laying operations, which will reduce disruptions to pedestrian as well as vehicular traffic • Under no circumstances, contractor shall use the cable laying route alignments as an interim stack yard for materials of any kind /type even for limited durations of less than a day	PIU-EHS and Independent and PIU-Site In charge (at Package level) and PIU-Head	PIU-Head
CONSTRUCTION STAGE				
5	Project site	• The cable route alignment shall be strictly as per the cable route marked in the DPR and shall exclude/avoid telephone/electricity poles, small trees and any other minor obstacles. In case of major	EPC –EHS	PIU-EHS and Independent 3rd

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
	preparation	obstacles, realignment of cable route shall be done with prior approval of PIU-EHS and PIU Site In-charge. • The operations area shall be along footpath, with footpath/kerb being one edge, and other edge of corridor extending on to road up to a maximum of 2m. Ref ESIA Report for Operational area details) • In case of roads which do not have foot paths, the line of sight with trees/poles shall be considered as one edge of the 2 m wide corridor and other edge of corridor extending on to road up to a maximum of 2 m. • Contractor shall open-up only this 2 meter wide and 500 metre long cable route segment at any one single location and at maximum 10 locations spread across areas within the package for cable laying operations at any given point of time. • The 2 meter wide corridor of impact/operations area is to be barricaded on both sides in 500 meter long segments along cable alignment with provision for temporary access at regular intervals to cross over across barricaded area for building owners. • The barricaded 2 m wide and 500 metre long segments shall be cleared of all unwanted materials. Gentle water sprinkling may be carried out to suppress dust levels prior to site cleanup and clearing operations. Details of water tankers and dust suppression accessory requirements are given in the subsequent section of this ESMP, which shall be strictly adhered /followed by contractor. • The barricaded operational area shall have fixed entry and exit points to minimize disturbance to adjacent residential/commercial buildings, except for providing any access to buildings, which are in the intermediate stretches of barricaded area. • The barricading shall comply with the standard designs and specifications of the Central Public Works Department CPWD) and approval of PIU-EHS. The barricading shall not unnecessarily impinge on to the roads and footpath and ensure only minimum area is barricaded as per requirements • Minor repairs to footpaths and walkways, which are adjacent to barricaded area shall be undertaken to ensure all uneven surfaces are filled up for pedestrian safety and movement, as a result of constrictions due to barricading for the project. ESMP includes cost provision for minor repairs of footpaths to ensure pedestrian safety during cable laying operations. All payments shall be made as per actual measurement at site and approval of PIU-EHS.		Party agency appointed by PIU and PIU- Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		• All ramps and steps, like to get damaged due to cable trench operations are to be enumerated (ESIA also provides a similar list carried out earlier along with videography of cable route alignment) and marked for replacement/restoration to its previous stage. • Reflective caution boards for diversion of pedestrian as well as vehicular traffic shall be installed at all required places after a due diligent assessment of every 500 metre long segment under approval from PIU-EHS. • All road side drain chutes on either side of the barricaded area (longitudinally) shall be checked and cleared for any blockages, so as to ensure proper drainage and prevent stagnation of strom water as a consequence of barricaded operational area and inconvenience thereof to vehicular as well as pedestrian traffic.		
6	Deployment of Traffic Wardens	• Traffic wardens, with requisite permissions from Police Department shall be deployed along cable route alignments, which are close to junctions and major road intersections to ensure smooth traffic movement and diversion of traffic as may be required, due to barricading and cable laying operations • Adequate number of traffic wardens (minimum of two wardens at each major junction and atleast one warden at any major road crossing) shall be deployed from 8 Am to 8 Pm on all days, until the works are completed and work shifted to adjacent segment. • Traffic wardens shall be adequately experienced and provided with reflective safety jackets and hand held reflective batons for traffic control and managment	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
7	Excavation of Cable Trenches	• Cable trench excavation shall be essentially carried out through compact mini excavators to the extent possible. Mini excavators, which can excavate trenches within 2m wide barricaded operational area are commercially available viz Bobcat 450, Vectra 175, JCB Robot 135 Skid steers with trencher and backhoe attachments/accessories • Deploying mini excavators will enable to minimize width requirements of the operational area, which is to be barricaded and thus avoid disruptions/diversion to both pedestrian and vehicular traffic. • Mechanical excavations are to be essentiality supplemented by manual excavation at some stretches in order to maneuver minor obstacles within the barricaded operational area like kerb/road side small trees/saplings, telephone/electric poles, which will otherwise require shifting or removal for movement	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		of excavators, if mechanical means of excavation is to be adhered all through the alignment. • During excavation utmost care shall be taken to ensure no public utilities like water supply pipes, sanitary/sewer pipes, telecom, electric cables and any other utilities are disrupted /damaged. In case any such disruption/damage, contractor shall immediately deploy relevant work force to restore the damaged utility • Contractor shall also provide temporary access to all buildings, which have been affected as a consequence of cable trench excavation and restore the damaged ramps/steps and any other associated structure at no cost to affected building/people. ESMP includes cost provision for restoration/replacement of all such ramps/steps/other structures, damaged due to cable trenching operations. All payments shall be made as per actual measures at site and approval of PIU-EHS • The road cut (both bitumen and CC roads) materials shall be disposed off in GVMC approved dumping/disposal sites in covered tipper trucks. The excavated earth, beneath pavement layers shall be reused for backfilling and hence shall be stacked within the barricaded area. • Care shall be taken not to mix up road cut materials with other excavated good earth beneath and both operations are carried out in separate batches i.e. removal of bitumen layers completely first in the entire 500 meter long segment and followed by earth excavation. • In order to suppress dust levels during trench excavation, periodical sprinkling of water through tankers fitted with pressurized fine spray has to be carried out. Contractor shall ensure availability of at least 1 tanker of 6000 litres capacity and pressurized nozzle spary and 500 meter long 63mm diameter hose for every (2x500m) 1000 meters long segment to suffice requirement.		
8	Cable Pullout and Laying	• Once the trench excavation is completed to required dimensions, cables (as per required sizes and configuration) need to be pulled out from cable coils through mini excavators used for trench excavation fitted with required additional accessories. • To the extent possible, cable pull out and lowering operations shall be limited to barricaded operational area and manual operations are avoided • Once the cables are pulled out and lowered into trenches as per project design requirements, jointing of the cables are to be completed as per specifications	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		• Cable pull out, lowering and jointing operations can pose safety concerns and therefore all work force deployed in operations shall be properly trained, and provided with all required PPEs like safety helmets, face masks, ear plugs, protective gear with reflective jackets and safety shoes mandatorily. • The barricaded operational areas shall be access controlled and barred for entry by un-authorized persons from public safety point of view.		
9	Trench Backfilling Operations	• All backfilling operations shall be carried out in layers not exceeding 15 cm along with required level of consolidation and compaction at optimum moisture content to achieve maximum density • Proper compaction will enable a firm base and sub base and prevents cracking of upper bitumen pavement layers and increase life and smooth riding surface, benefitting road users • Mechanical compactors with vibratory rollers (width of sub 1 metre) are available, which can work effectively for trench backfilling operations shall be deployed for better results. Models like ATLAS COPICO LP 6500 Double drum Rollers are best suited for compacting trenches with limited width such as in present case • Adequate quantity of water shall be used during consolidation and compaction of layers, which incidentally also reduces dust levels during backfilling operations	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
10	Road Restoration and clean up operations	• Road restoration works (for either bitumen and /or cement concrete roads as the case may be) are to be taken up as conforming to specifications specified by GVMC. • Bitumen mix plants are to be set up at PIU-EHS approved suitable locations and shall have all required regulatory compliances like CTE/CTO and consent conditions thereof • In case of restoration of cement concrete roads, concrete of required grade as per GVMC specifications shall preferably procured from ready mix plants and same shall be used, which will in turn reduce the in situ impacts arising out of concrete batch mixing plants • Care shall be taken during the road restoration works so as not to leave out any areas unpaved within the operational area and bordering the operational areas. • Also, care shall be taken to match the levels of old and newly restored surfaces, so as to have an even surface after restoration • The operational area is to be thoroughly cleaned for all debris, either un-unusable materials or all unwanted materials are to be collected and disposed in approved locations by GVMC. • All drainage outlets into storm drains along barricaded area are to be checked for blockages, if any and cleared.		

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		• The barricaded area shall be opened up only after ensuring these measures. • All works of cable laying shall be completed including road restoration and site cleanup, prior to moving on to next 500 metre cable route segment.		
11	Construction vehicles, equipment and machinery	• All vehicles, equipment, and machinery to be deployed for cable laying operations shall be in good condition and preferably not less than 5 years old. • The EPC Contractor shall ensure that all vehicles, equipment and machinery used for construction are regularly maintained and meet emission limits set by APPCB and Motor Vehicles Acts & Rules. • The Contractor shall keep a record of the PUC certificates for all vehicles/equipment/machinery used for the Project and will be made available to PIU-EHS.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
12	Water requirement for dust suppression, consolidation and compaction of cable trenches during backfilling operations	• Water requirements are to be met from only tube wells, with the approval of PIU-EHS. • Visakhapatnam falls under safe category and therefore sourcing of ground water shall not pose any restrictions to REN/UG Project. • Surface water bodies SHALL NOT be chosen for sourcing or meeting requirements of the REN/UG project.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
13	Use of fine sand material for backfilling operations	• All sand requirements for backfilling of cable trenches are to be sourced from sand mining operators, licensed and approved by the Department of Mines, Government of Andhra Pradesh. • A copy of the license for sand mining issued to the mining operator has to be submitted to PIU-EHS, prior to procurement.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
14	Sourcing of local labour (skilled/unskilled)	• Recruit unskilled labour from local communities and eligible local people for skilled labour (if available) to give maximum local employment opportunities.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
				and PIU- Site In charge (at Package level)
15	Workforce/construction camp sites and material stockyards	• No camps for workforce shall be set up near operations area. • The operations area being largely within city limits, all local workforce shall return o their places of residence and out station workforce, if any shall be housed in rented accommodation and provided with all basic amenities. • If adequate accommodation is not available, Contractor may set up construction camps at any suitable nearby site with prior approval from PIU-EHS. • All such construction camp sites shall be provided with safe drinking water, sanitation, and other basic infrastructure facilities like fuel for cooking, lighting, entertainment, and basic health care for workers to ensure that they are not dependent on outside sources for their basic requirements. Alternatively Contractor shall explore renting suitable accommodation with all basic facilities • Material stockyards required for Project shall be up at GVMC/PIU approved locations and all material shall be orderly stacked and covered to prevent pollution and accidents.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
16	Transport of construction materials	• All vehicles used to transport of materials to the operational areas shall be covered to avoid spillage of materials like sand etc. • Public safety has to be ensured at all times during transportation and protruding of materials outside the body line of the trucks/vehicles shall be strictly prohibited and suitable size of trailers shall be used in such cases • Contractor shall only deploy well-maintained and less than 5-year old vehicles for transportation of construction materials, cable coils etc, to ensure reduced noise levels and vehicular emissions.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
17	Drainage control	• EPC Contractor shall ensure that no construction materials like earth, stone, or appendage are disposed off in a manner that can block the flow of drainage in and around the operational areas. • All road side drain chutes on either side of the barricaded operational area (longitudinally) shall be checked and cleared for any blockages, so as to ensure free flow of strom water and prevent stagnation of water near or after the barricaded operational area and inconvenience thereof to vehicular as well as pedestrian traffic.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
18	Potential water pollution from use of fuel, lubricants, and their storage/handling areas at material stock yards	• EPC Contractor shall take pre-cautionary measures to ensure that no water pollution occurs through surface runoff from construction vehicle parking areas, fuel/lubricants storage sites, vehicle, and machinery/equipment maintenance sites. • EPC Contractor shall ensure that all vehicle/machinery and equipment operation, maintenance and refueling shall be carried out in such a manner that spillage of fuel and lubricants do not contaminate soil and groundwater. • Areas used for handling of fuel and lubricants, wherever applicable shall be lined with impermeable material to prevent groundwater and soil contamination in the event of accidental spills.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
19	Potential increase of dust level at work sites	• EPC Contractor shall take every precaution to reduce the level of dust from operational areas thorough regular sprinkling water through water tankers fitted with pressurized fine spray system. • The frequency of water sprinkling shall be determined based on site-specific requirements to contain dust generated from cable laying activities.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
20	Noise from vehicles, construction batching plants and equipment	• The EPC Contractor shall ensure that construction plants and equipment used shall strictly conform to the MoEF/CPCB/SPCB noise standards. The maintenance of vehicles, equipment and machinery shall be done regularly to keep noise levels at the minimum. • All major noise-generating construction activities shall be limited to day hours only and no night shifts shall be allowed. • Personnel exposed to high noise levels (beyond 70 dB) shall be rotated every two hours to provide short breaks	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
21	Construction debris and waste disposal	• All construction waste materials shall be disposed of at locations approved by GVMC and PIU-EHS • No construction debris shall be transported and disposed of at municipal waste disposal sites. • All vehicles carrying such waste materials for disposal shall be covered to avoid enroute spillages on roads, causing inconvenience and visual impacts to local population.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
				Package level)
22	Clean-up operations, restoration and rehabilitation	• EPC Contractor shall undertake site clean-up of operations as approved by PIUI-EHS. • The clean-up operations by EPC Contractor prior to demobilization and shall include removal of construction debris, unused/waste materials, etc. and disposal of same at approved locations by GVMC/PIU-EHS	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
23	Environmental monitoring at construction sites	• Quarterly monitoring of ambient air quality, noise level, at selected sampling locations across the package areas representing different categories like residential, commercial, sensitive areas and pre-construction and post construction stage of cable laying operations etc shall be undertaken through an external laboratory approved by APPCB and environmental monitoring report shall be submitted to PIU-EHS for review and corrective actions, if any required	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
24	Community participation	• Communication channel will be kept open with local people around the operational areas to ensure that cable laying activities are not causing undue inconvenience to the local people.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)
25	Implementation of grievance redress mechanism (GRM)	• PIU-EHS in coordination with EPC Contractor shall set-up a GRM as soon as contract is awarded and mobilization of contractor. Suggested GRM is given in ESIA report • Package-level GRM shall receive any complaints/grievances (either orally or in documented form) from local people/adjacent building owners) related to EHS and PAP issues or disruption of services/utilities and resolve matters expeditiously in a time bound manner. • PIU-EHS and EPC–EHS shall inform the affected persons (APs) on the grievance redress procedure, who to contact and when, where and how to file a grievance, time likely to be taken for redress of	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)

Sl. No.	Environmental Issue	Management Measures	Responsibility	
			Planning and Execution	Supervision/Monitoring
		minor and major grievances, etc. The number of grievances recorded and resolved and the outcomes will be disclosed in the PIU office and also included in the periodic progress reports of ESMP implementation monitoring and audit reports submitted to PMU for review.		
OPERATION STAGE				
26	Shifting of existing overhead utilities	• Once the REN/UG cable project is commissioned, the existing over head electrical distribution infrastructure shall be dismantled • All reusable equipment as determined by PIU shall be stacked in approved locations in the manner as decided by PIU • All disposable equipment as determined by PIU shall be stacked in approved locations in the manner as decided by PIU • Contractor shall ensure public safety as well as safety of work force during the dismantling of the existing overhead electrical distribution infrastructure as well as its transport to approved locations • Trained and experienced work force shall be deployed for dismantling OH infrastructure. Thw work force shall be provided with all required safety gears for working at height and other PPEs like safety boots, reflective jackets, hard hats, among others • The serviceable materials like transformers, which have pollution potential due to leakage of oils/lubes, shall be stored on impermeable surfaces areas within store yards prior to redeployment or disposal as scarp, as the case may be. All such impermeable surfaces shall be either be covered or provided with separate storm water drainage system, which will be further diverted to the municipal sanitary system.	EPC –EHS	PIU-EHS and Independent 3rd Party agency appointed by PIU and PIU- Site In charge (at Package level)

Table 9.2: Summary Budgetary Provision for ESMP Implementation and Monitoring for REN/UG Project (Package I)						
S.No.	**Item Particulars**	**Unit**	**Rate (in Rs.)**	**Total Quantity**	**Total Amount (in lacs)**	**Remarks**
A	**ESTIMATED COSTS FOR IMPLEMENTATION OF EMP**					
1	Carrying out minor repairs to footpath along side barricaded area to ensure all uneven surfaces are filled up for pedestrain safety during UG laying works using PCC 1:4:8 (25 mm thick) or CM 1:6 (20mm thick) Note: Payment to contractor shall be made on actual measurement at site	per sq.m	150	10000	15	Activity required to remove minor undulations on the footpath and ensuring pedestrian safety as a consequence of reduced walkway due to cable laying operations
2	Site preparation and clearing of remnants/debris within the barricaded operational area along cable routes in segments of 500 metres over 165kms length of cable route	Deemed to be included in Project Cost				
3	Providing MS fabricated Barricading up to 2 metre high on both sides of cable trenches in 500 metre segments and considering opening up of cable laying operations at 10 different locations over 150 km of cable route length across the package area(@60% of capital cost of MS Barricades)	No.s	16500	4000	396	As per breakup estimate given in Annexure 4
4	Restoration of ramps/steps in cement concrete of M15 Grade and/or Brick masonary matching with exisitng part rams/steps as required and per site condition	Included under Estimated Costs For Resettlement Action Plan & Implementation Monitoring				
5	Restoration of Bitumen roads as per GVMC Specifications/Requirements	No Separate Provision Made, Deemed to be included in Project Cost				
6	Restoration of CC roads as per GVMC Specifications/Requirements	No Separate Provision Made, Deemed to be included in Project Cost				
7	Provision of PPEs for work force kike safety boots, hard hats, masks, reflective jackets and other PPEs as per requirements	LS			30	As per breakup estimate given in Annexure 4
8	Site clean up, prior to opening up of barricaded area for traffic including removal of blocks in drainage chutes to road side drains	per km	5000	150	7.5	Deemed to be included in Project Cost
9	Pressurized water spary for dust suppression through mobile water tankers within barricaded operational area				14	As per breakup estimate given in Annexure 4
10	Removal of blockage in drainage chutes to road side drains	No Separate Provision Made, Deemed to be included in Project Cost				
11	Restoration of disrupted utilities (Water Supply/Sanitary/Telecom etc)	No Separate Provision Made, Deemed to be included in Project Cost				
12	Safe disposal of Bitumen road cuttings at GVMC approved locations through covered tipper trucks				56	As per breakup estimate given in Annexure 4

S.No.	Item Particulars	Unit	Rate (in Rs.)	Total Quantity	Total Amount (in lacs)	Remarks
13	Disposal of Construction debris at GVMC approved locations through covered tipper trucks	No Separate Provision Made, Deemed to be included in Project Cost				
14	Deployment of Traffic Wardens at road crossings/junctions to ensure smooth movement of traffic , consequent to cable laying operations/ Barricades	per location			50	As per breakup estimate given in Annexure 4
15	Installation of caution boards at all required locations along segments which have been opened up for cable laying operations and consequently barricaded				12	As per breakup estimate given in Annexure 4
16	Providing temporary and safe access to buildings throughwooden planks/ply boards and/or MS sheets as per site requirements	No Separate Provision Made, Deemed to be included in Project Cost				
17	Environmental Monitoring by third party APPCB approved laboratories/agencies under the guidance of EHS-PIU during UG cable laying operations				25	As per breakup estimate given in Annexure 4
18	Deployment of Environmental and Social Safegaurds Specialists at PIU to effectively function as EHS-PIU for 24 months- common for all SIX packages				30	As per breakup estimate given in Annexure 4
19	ESMP monitroing by 3rd Party Independent Auditor appointed by PIU- common for all SIX packages				60	As per breakup estimate given in Annexure 4
B	**ESTIMATED COSTS FOR RESETTLEMENT ACTION PLAN & IMPLEMENTATION MONITORING**					
20	Restoration of ramps/steps in cement concrete of M15 Grade and Brick masonary as required per site condition as replacement cost of structures for non-title holders				200	As per breakup estimate given in Annexure 4
C	**SUBSISTENCE ALLOWANCE TO SQUATTERS (ONE TIME)**					
21	One time grant as subsistance allowance for Squatters	per squatter	30000		20	As per breakup estimate gven in Annexure 4 & RAP
22	One time grant for loss of livelihood to all squatters with commercial activities/vendors	per squatter	25000		24	As per RAP Report
23	Training Assistance for Income generation to vulnerable households	per household	10000		4	
D	**RAP implementation monitoring by NGOs**					
24	Training of PIU Staff on RAP	LS			3	
25	Hiring of NGO (for package 1 of REN/UG Cabling Project) over 24 months to implementation supervision of RAP	LS			50	
26	Hiring of agency for M & E of RAP implementation	LS			15	As per breakup estimate given in Annexure 4
				TOTAL (Rs. in Lacs)	**1012**	
				Rounded off to	**10 Crores**	

9.4. INSTITUTIONAL ARRANGEMENTS FOR EMP IMPLEMENTATION MONITORING

9.4.1. Over-all Project Administration Mechanism

The REN/UG Cabling project Component will be implemented by the APEPDCL and a dedicated PIU will be housed within APEPDCL. The PIU under APEPDCL will designate a nodal officer for environmental and social safeguards management or appoint an 'Environmental and Social Safeguards Specialist Auditor' for monitoring and overseeing ESMP implementation in all 6 packages during the implementation phase. The PIU will also have to appoint a 3rd party agency for day to day monitoring of ESMP implementation (at package level) The PIU also further have to engage a APPCB approved laboratory, for periodical environmental monitoring of ambient air and noise level during project implementation phase

The PMU will also appoint a third party auditor for safeguards management of all project components under APDRP including the REN/UG cabling project. The PIU under APEPDCL will also be responsible for quality assurance through third party auditors appointed by PMU.

At the apex level, the State level Project Steering Committee (SCC) constituted for NCRMP will oversee and monitor the overall progress of APDRP. The State Project Implementation Unit (SPIU) for NCRMP will act as the Project Management Unit (PMU) for APDRP and will be supported by sector experts implementing the project investments. Apart from the sector experts, the PMU also has Environmental and Social Safeguard Experts. The implementation arrangements as included in the ESMF of APDRP are shown in **Figure 9.1.**

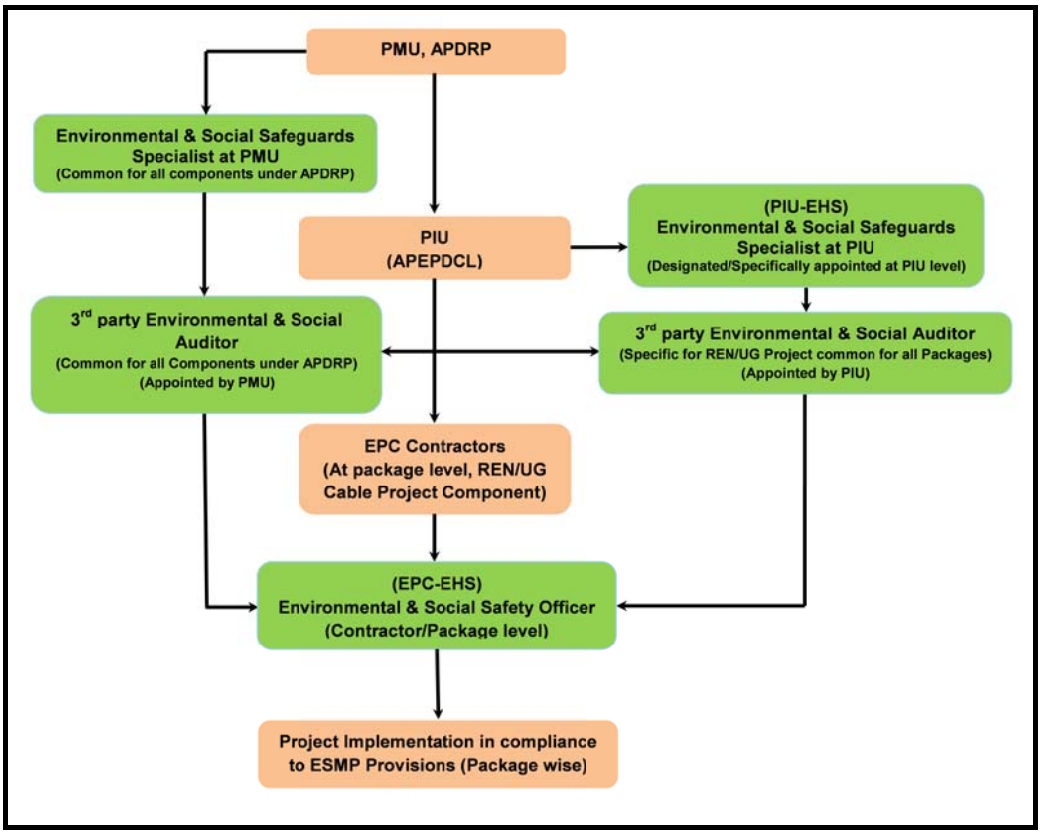

Figure 9.1: Institutional Arrangements for ESMP implementation
(Both at PMU & PIU level)

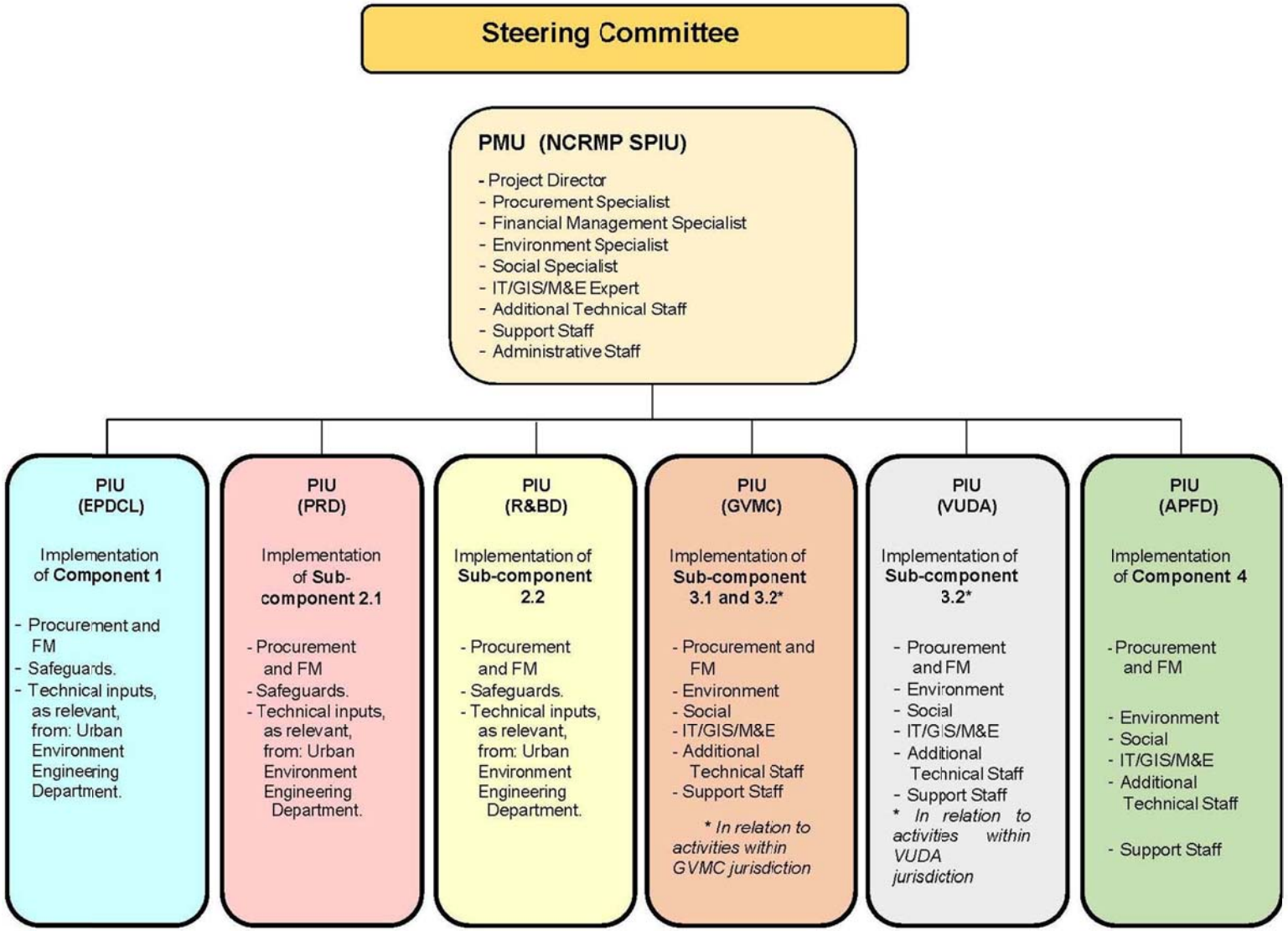

Figure 9.2: The implementation arrangements as included in the ESMF of APDRP

9.5. ROLES AND RESPONSIBILITIES ESMP IMPLEMENTATION MONITORING

The roles and responsibilities of PMU and PIUs, particularly with respect to environmental and social safeguards management are laid out in the ESMF, APDRP. However, same has been reproduced hereunder in a summarized form for reference.

The SCC will be responsible for:

Approve project investments and help coordinate the activities of various departments, including in obtaining required approvals/ clearances for the Project. This shall be done through semi-annual review meetings, where the SCC shall:

- Review the budgets.
- Review progress against the defined milestones.
- Review critical findings of the audit and evaluation reports.
- Provide such guidance, as it may deem necessary for the Project.

The PMU will be responsible for:

a. Overall project management and reporting;

b. Coordination with PIUs and line departments in approval of designs, assisting the PIUs in preparation of: Detailed Project Reports (DPRs), bidding documents, tendering schedules, etc.;

c. Implementation of Component 5;

d. Appointment of technical assistance consultants and others safeguards management support to the implementing agencies;

e. Quality Assurance through third party audits;

f. Maintaining MIS and Quarterly reporting;

g. Progress reporting, financial management, monitoring and reporting;

h. Ensuring safeguards compliance with agreed implementation procedures and other Bank requirements, etc.;

i. Redressal of Grievance

The PIU will be responsible for:

j. Preparation of DPRs including technical designs, surveys and investigations, etc.;

k. Tendering, bid evaluation, contract award, contract management, etc.;

l. Financial Management and safeguards compliance;

m. Progress and expense reporting to the PMU;

n. Coordination with line departments for design, implementation, and hand- over arrangements;

o. Leading social and environment screening exercise for every sub-project site.

p. Integrate findings of the screening and assessments (where applicable) in the sub-project selection and/or design process.

q. Preparation of the EA/SA and EMP/RAP documents along with the DPRs, where applicable either through internal resources or external consultants.

r. On-site review for compliance with the ESMF, EMP and the RAP requirements.

s. Take required actions, including application of contractual remedies,on contractors when needed.

t. Provide required update/data/information to the PIU on ESMF implementation.

u. Designate an officer or appoint expert(s) for environment and social management/safeguard activities.

v. At the sub-project level, the contractor would be responsible for planning, executing and coordinating the implementation of the ESMF provisions as laid out in the contract documents; overseen by the concerned environmental and social management expert at PIU/Project level.

w. Appoint an 'Independent/Third Party Auditor' to audit/review the implementation of the works in accordance environmental, health and safety management provisions set out in the respective contracts.

x. Grievance redress.

9.5.1. Independent third party consultants

The independent third party consultants will be appointed by the PMU to provide independent assurance on compliance with the ESMF across project components. The third party consultants shall:

- Support the PIU(s) in preparing the safeguards audit plan.
- Prepare compliance report for sub-project activities in line with ESMF guidelines and other statutory requirements as applicable through scheduled or unscheduled audits.
- Conducting random field visits and review compliance, especially at the environmentally or socially sensitive areas.
- Review the performance of the project through an assessment of periodical monitoring reports submitted by the line departments and PIU.
- Share REVIEW findings with the PIU to aid in timely decision making and adopting appropriate mitigation action/s, if necessary.

9.6. Over-all Project Supervision, Reporting and Monitoring (SRM)

The ESMF under APDRP has laid out the thematic areas that are to be supervised, monitored periodically as hereunder.

1. Periodic Physical Progress Monitoring
2. Regular Quality Supervision and Certification
3. Social and Environmental Monitoring & Third Party Quality Audit
4. Over-all Monitoring and Evaluation

9.6.1. Periodic Physical Progress Monitoring - Physical progress monitoring has to be carried out by APEPDCL on a monthly basis in their respective domains and also including environmental and social safeguards management to record and report on the progress of works. The PIU will also, in coordination with the respective beneficiaries and contractors, identify any constraints and delaying factors.

9.6.2. Environment and Social Monitoring - This will comprise of the following sets of activities:

a) Monitoring compliance with environmental regulations, social safeguards and Environmental and Social Management Framework (ESMF) provisions and

b) Monitoring and oversight of social and environmental issues at state/project levels.

A third party audit/review agency, appointed by PIU (specifically for REN/UG component) and PMU (common for all components under APDRP) will evaluate the level of compliance of ESMP provisions at all stages of project implementation. A comprehensive assessment report on environmental performance will be prepared by the APEPDCL at mid-term and end-term.

9.6.3. Regular Quality Supervision & Certification – PIU under APEPDCL will carry out regular quality supervision and certification, which shall form the basis of payment certification. Additionally, compliance on social and environmental aspects shall be taken into account before the bills are paid to contractors.

9.7. Monitoring Frequency and Responsibility

The monitoring responsibility and frequency as spelt out in ESMF, APDRP is given hereunder. Each designated Environment and Social Specialist at PMU and PIU shall be responsible for overseeing compliance of all components under APDRP to WB safeguards requirements, GoI/GoAP regulations and applicable ESMF guidelines. The specialists shall also review regularly, the timely implementation of environment and social provisions as per the ESMF, EMP and RAP, where applicable.

The aspects shall be monitored as per the frequency and are to be reported is provided in **Table 9.3**. Corrective actions, wherever required shall be initiated in a planned manner so as to ensure compliance to the ESMF/EMP measures. The periodic monitoring will help to determine the effectiveness of the management measures implemented or being implemented as well as to determine corrective measures, if any required during the tenure of REN/UG cabling project implementation.

The monitoring and reporting will be done by PIU under APEPDCL, which in turn will be reporting to PMU.

Table 9.3: Monitoring Frequency and Responsibility for REN/UG Cabling Project

S.No.	Particulars	Frequency	Reporting Responsibility	Monitoring responsibility
1	ESMF Compliance/Status Report, including screening results, status of conduct of EIA/SIA and actions taken for compliance	Monthly/ Quarterly	PIU, Environmental and Social Experts	Project Director - PMU, Environmental and Social Specialists
2	Environment and social site visit report	Quarterly	PIU, Environmental and Social Experts	Project Director - PMU, Environmental and Social Specialists
3	Regulatory clearances	Quarterly	PIU, Environmental and Social Experts	Project Director - PMU, Environmental and Social Specialists
4	Verification of land to be acquired and status of land acquisition	Monthly	PIU, Social Expert	Project Director - PMU, Environmental and Social Specialists
5	Distribution of entitlements and assistances	Monthly	PIU, Social Expert	Project Director - PMU, Environmental and Social Specialists
6	Community consultations	Quarterly	PIU, Environmental and Social Experts	Project Director - PMU, Environmental and Social Specialists
7	Grievance redressal	Monthly/ Quarterly	PIU, Social Expert	Project Director - PMU, Environmental and Social Specialists

SECTION 10
GRIEVANCE REDRESS MECHANISM

10.1. GENERAL

APEPDCL through its PIU for REN/UG project will establish a robust and responsive grievance redress mechanism, given the nature of this project component and its potential to disrupt public utilities, water, sanitary utilities, impact upon street vendors/squatters among others and trigger public resentment, despite the benefits, that the project can usher on society.

10.2. GRIEVANCE REDRESS MECHANISM

The REN/UG cabling project will have a package wise grievance redress mechanism (GRM) as shown in the **Figure 10.1** to resolve environmental and social issues, disruption in public utilities, inconveniences to general public among others. The GRM will be established by the PIU under APEPDCL and the EPC Contractor will be severally and jointly responsible to receive and resolve complaints in a time-bound and effective manner.

The establishment and effective functioning of GRM is utmost essential as this project is being implemented along city roads, which is expected to can cause disruptions to pedestrian and vehicular traffic, damages to underground utilities of both public and private utilities. The UG cabling project inherently also has public safety issues among others. Therefore a mechanism is to be established to receive complaints and resolve them in a time bound manner.

The package level site in-charge in charge shall establish a procedure for receiving grievances, recording/documenting key information, and evaluating and responding to the complaints in a reasonable period of time. All concerns received/raised through the GRM are to be addressed earnestly, transparently and in a time bound manner, without retribution to the grieved/affected person(s).

PIU and contractor periodically will inform the general public in and around the cable route alignments, which have been opened up for cable laying on the grievance redress procedure, whom to contact and when, where and how to file a grievance, time likely to be taken to redress minor and major grievances, etc. The grievances received, resolved, level at which it was resolved and time taken is to be documented during the tenure of project. The number of grievances received, resolved and outcomes are to be displayed/disclosed at PIU and included in the periodic progress reports.

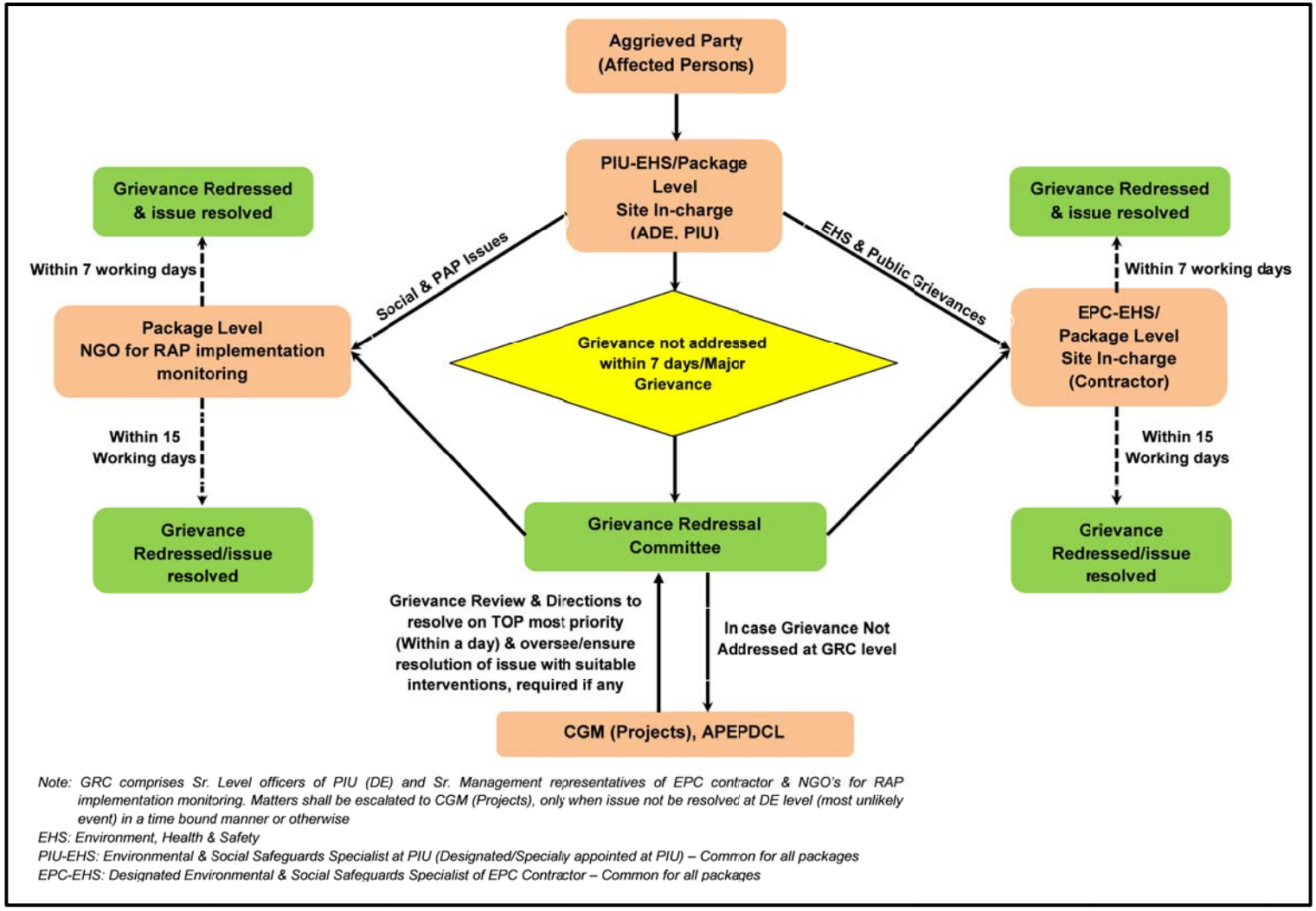

Figure 10.1: Grievance Redressal Mechanism under REN/UG Project

ANNEXURE 1
Scope of Work & Terms of Reference for ESIA studies

Section 7. Terms of Reference

1.1 Introduction

"Hudhud" a very severe cyclonic storm made landfall on the coast of Andhra Pradesh, near the city of Visakhapatnam on October 12, 2014. At the time of landfall, the estimated maximum sustained surface wind speed associated with the cyclone was about 180-220 kmph and the sea tides rise up to a height of 3 meters. The tide gauge at Visakhapatnam reported maximum storm surge of 1.4 meters above the astronomical tide. By October 14, "Hudhud" drifted northwards toward Uttar Pradesh and weakened into a well-marked low-pressure area over east Uttar Pradesh and neighbourhood.

The Government of Andhra Pradesh (GoAP) was proactive in preparing for the management of the possible disaster due to cyclone "Hudhud". In addition to the updates from India Meteorological Department (IMD), the intensity and magnitude of the cyclone were continuously tracked at Andhra Pradesh State Disaster Management Authority (APSDMA) and a range of preparatory measures were launched to face the cyclone. Relief and rescue teams were deployed in the coastal districts which are most likely to be impacted and regular warnings to vulnerable populations were issued through various channels. This, supplemented by the evacuation of close to 250,000 persons, mostly living in vulnerable kutcha houses or low-lying areas, helped to limit the death toll due to the cyclone to 61.

Cyclone "Hudhud" and the associated heavy rainfall and floods caused extensive devastation in all the affected districts, uprooting vast number of trees, damaging roads, public buildings, livelihoods and disrupting telecommunications and power infrastructure.

1.2 The Project - APDRP

The Andhra Pradesh Disaster Recovery Project (APDRP) constitutes a large multi-sector engagement on risk and vulnerability reduction, with assistance for restoring and improving rural connectivity, public services and livelihood opportunities in targeted communities of Andhra Pradesh, and increase the capacity of the State Entities to respond promptly and effectively to an eligible crisis or emergency. This project is part of a broader package to support the GoAPs reconstruction and recovery efforts and to strengthen its capacity to mitigate and manage future events.

1.3 Project Development Objectives

The Project Development Objectives (PDO) are to restore, improve, and enhance resilience of public services, environmental facilities, and livelihoods in targeted communities, and to enhance the capacity of state entities to respond promptly and effectively to an eligible crisis or emergency.

1.4 Project Beneficiaries

The project, through its different components, will provide both direct and indirect benefits to the State of Andhra Pradesh and its 49.4 million inhabitants. Direct beneficiaries include populations of the coastal areas affected, specifically the four heavily impacted districts of Srikakulam, Vizianagaram, Visakhapatnam and East Godavari with a total approximate population of 13.3 million residents.

1.5 Project Components

The project has seven components:

i) **Resilient electrical network;**
ii) Restoration of connectivity and shelter infrastructure;
iii) Restoration and protection of the beach front;
iv) Restoration of environmental services and facilities and livelihood support;
v) Capacity building and technical support for disaster risk management;
vi) Project implementation support; and
vii) Contingency emergency response.

1.6 Component 1: Resilient electrical network

The objective of this component is to reduce the vulnerability of the city's electrical network by laying the power distribution system underground. Andhra Pradesh Eastern Power Distribution Company Ltd. (APEPDCL) will be the implementing agency for the component. Existing 33kV, 11 kV and 415 volts over head network lines will be converted to underground cable network starting from consumers meter board to 11 and 33 kV feeders. The conversion process will be initially taken up from the beach road and proceed towards landside in Visakhapatnam city. The component will also include the provision for high-speed data/voice transmission cables in the city of Visakhapatnam.

1.7 Component 6: Project implementation support

This component will finance establishing and operating the Project Management Unit (PMU) and the Project Implementation Units (PIUs). In addition, the component will also finance consultancies required for the preparation of DPR, supervision of specific activities, monitoring and evaluation, trainings, exposure visits, studies on safety net practices in post–disaster situations, inclusive and gendered practices in disaster mitigation planning, preparedness and responsiveness, knowledge exchange programs etc.

1.8 Project Cost and Financing

The total project cost along with individual component's cost are estimated and these are presented in Table-1.

Table 1:Details of the Finances per Project Component

Project Components	Total Cost (US$ M)	IDA Financing (US$ M)
Component1: Resilient electrical network	120.0	81.0
Component6: Project implementation support	25.0	17.0
Total Project Cost for all 7 components	370.0	
Total Financing Required	250.0	
Amount to be funded by Govt. of AP	120.0	

2.0 OVERVIEW OF THE PROJECT

2.1 Introduction

Conversion of the distribution network i.e., LT upward to 33kV into Underground Cabling was contemplated as a remedy to overcome cyclonic induced power disruption for which Eastern Power Distribution Company of A. P. Limited (APEPDCL) was the implementing agency.

2.2 Existing OH System

2.2.1 Existing OH system of Entire APEPDCL

APEPDCL is responsible for managing distribution and bulk supply of power in Srikakulam, Visakhapatnam, Vizianagaram, East Godavari and West Godavari districts of Coastal Andhra Pradesh. The jurisdiction of APEPDCL is shown in Fig-1. APEPDCL supplies power to over 5.107 million consumers belonging to different categories through a network consisting of 656 Nos. 33/11 KV Sub-stations, 2704 feeders of 11 KV level and 1,51,447 Nos. distribution

transformers. The Corporate Office of APEPDCL is situated at Visakhapatnam. Distribution network stretches from Srikakulam district in the North of Andhra Pradesh to West Godavari district in the South.

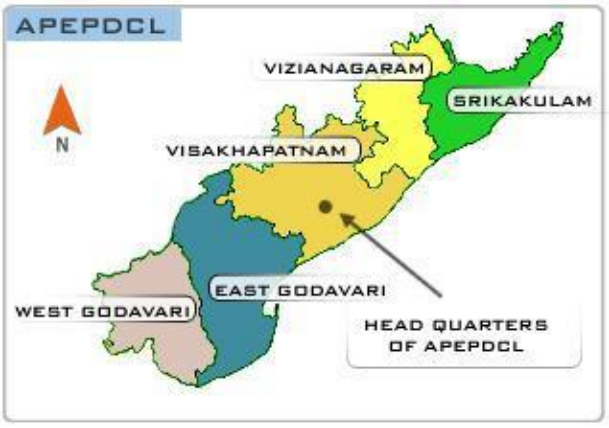

Figure-1: APEPEDL Jurisdiction Map

2.2.2 Existing OH system of VIZAG CITY

The Visakhapatnam city, being the industrial capital of the Andhra Pradesh, became the prime focus attracting multi faceted development. Hence it is necessary to plan for disaster resilience. As a part of the process, APEPDCL initiated the conversion of the existing over head power distribution network into underground system. The Salient features of the Visakhapatnam City are:

- Visakhapatnam city area – 681.96 Sq. Km.
- Visakhapatnam city population – 2.092 million.
- The Visakhapatnam City covers three Operation Divisions of APEPDCL i.e. Zone-I, Zone-II & Zone-III
- No. of 33/11 KV Substations - 70
- 33kV line length - 476.1 km.
- No. of 11 KV feeders - 321
- Total 11kV line length - 2198.37 km.
- Total no. of Distribution Transformers - 10734.
- Total Distribution Transformer capacity - 880.697 MVA.
- LT line length - 4028.58 km.

3.0 Environmental and Socio-economic Impact Assessment (ESIA)

The Environmental and Socio-economic Assessment studies are aimed at effective assessment and management of the possible environmental and social aspects in the process of implementation of the project. The environmental settings and the socio-economic scenario should be described properly for preserving or enhancing their quality. It will facilitate the implementation of the project in an environmentally and socially sustainable manner. Therefore a detailed Environmental and Social Impact Assessment (ESIA) is proposed as part of the underground cabling project of APEPDCL. These studies should be made efficiently suggesting appropriate measures to protect or enhance the quality of the environment and social settings.

3.1 Objectives

The objectives of the ESIA assessment and management studies are:

- To conduct an Environmental and Social Impact Assessment (ESIA) of each package of the Project by collecting required data, conducting necessary field investigations and primary surveys and assessing environmental, social, health and safety impacts of each package. (The underground cabling works consists of 6 packages for the entire Visakhapatnam city)
- To recommend suitable mitigation measures; both for Environmental and Social impacts based on the detailed ESIA.
- To identify and recommend suitable measures for the disposal of various unserviceable materials generated due to the project such as electrical cables, transformers, electric poles, soil and other waste or recyclable/reusable materials.
- To submit compliance report after completion of underground cabling works of each of the packages.

3.2 Scope

The Scope of the ESIA studies will consists of several aspects of both environment and society. The scope of the present studies includes:

- Transect Walk strip plans (based on strip plans provided by APEPDCL) with all the features along the alignment. The impacts, however minor, along the alignment to be marked on these plans.

- The entire alignment to be video graphed for records.
- Development of a detailed strip plan of the proposed underground cable alignment with reference to ESIA, providing various features that are located along the alignment and its immediate vicinity (at least double the width of the trench). A video of the transect walk shall be submitted.
- Preparation of environmental and socio-economical profile of the project town/ city, through primary and secondary information (comprising demographic, socio-economic, physical, biological and ecological environmental features, etc.)
- A socio-economic survey of the households along the alignment duly covering all indicators for the present and future evaluation and assessment.
- Preparation of a questionnaire or instruments for the ESIA study and share the same with World Bank for review.
- Based on the strip plan and field visits, develop an inventory of impacts to
    - Temporary and permanent structures
    - Trees and other environmental features
    - Various sensitive receptors such as schools, religious places and other common property resources and
    - Any other issues, which may be affected while laying the underground cable network and during operation and maintenance.
- Description of the existing underground infrastructure such as water distribution network, sewage system, telecom network etc. and impact of the present project on these infrastructure.
- Identification of various other issues such as disposal of excess excavated earth, waste, disposal/ reuse of old over head electric cables, dismantling/ disposal of electrical poles, disposal of excess transformers (if any), disposal of transformer oil (if any), etc.
- Assessment of the health and safety impacts of laying the underground cable network, both during construction and operation phase of the project.
- For all the impacts/ issues identified above, recommend elimination or mitigation/ management measures to be implemented by the project agencies and the construction contractors, in line with the Environmental and Social Management Frame work (ESMF) of APDRP.

- Study & inclusion of measures and plans mitigating temporary/ permanent impacts to the structures and communities along the cable alignment. Preparation of site specific EMP to mitigate environmental impacts, RAP (if there are resettlement/ rehabilitation issues) and/or SMP for mitigating social impacts and community engagement.
- Identification of various regulatory clearances that may be required for the project, such as CRZ, clearances, tree cutting permissions , "No objections" from state / national agencies, utility agencies, etc.
- Preparation of a Monitoring Plan with reference to SEIA
- A Grievance Redressal mechanism as given in ESMF as per World Bank guidelines available in their website "www.worldbank.org"
- Conduct formal stakeholder Public Consultations, to understand the impacts anticipated by the communities and also to explain measures the project proposes to implement to mitigate these impacts. These Public Consultations to be conducted with the communities for information dissemination and their feedback. At least one such consultation with women in each community. All the consultations need to be recorded. The World Bank and the APEPDCL need to be informed before conducting these consultations for possible participation.
- A minimum of three workshops with stake holders are to be organised by the Consulting Firm.
- After review, revising and finalising the EMP and RAP/ SMP for implementation.
- For any item which was not covered in the "Terms of Reference" but required for the Consultancy work, the rules/guidelines/norms of APEPDCL/World Bank shall be followed.

3.3 Qualification of Experts and other Requirements:

- One Environmental Expert with at least a Masters Degree in Environmental Science/ Engineering and the expert should have a total experience not less than 15 years with at least 5 years experience in similar projects.
- One Social Expert with at least a Masters Degree in Social Science / Social Work and the expert should have a total experience not less than 10 years and at least 5 years experience in similar projects.
- One GIS expert with at least 5 years experience in similar projects

- Experience in EIA/ESIA studies of Linear Developmental Projects in already developed urban agglomerations is desirable.
- Graduate field staff consisting of equal number of male and female staff with good knowledge in Telugu, Hindi and English languages.
- Sufficient field assistants with a minimum of 10+2 qualification shall be employed who can speak Telugu language.

3.4 Deliverables of the Project

The following are the expected deliverables of the ESIA studies.

a. Inception report which should include methodology for the conduct of EIA and detailed work plan including time schedules.
b. Detailed strip plan incorporating additional data for ESIA along with necessary photographs and video graphs as specified in the scope based on the basic strip plans provided by APEPDCL.
c. Report on Environmental and Social Impact prior to consultation with stake holders.
d. The summary and details of the conducted / organised stake holders meetings and preparation of MOM, photographs and video graphs.
e. Reports and recorded discussions with individual public.
f. Identification of locations for disposal of excess excavated earth, debris, bituminous road top, scrap etc. and a report with these details.
g. Submission of report consisting of Monitoring Plan and grievance redressal mechanism as part of the ESIA report.
h. Preparation and submission of package wise draft ESIA report.
i. Submission of package wise final report.
j. Plan for implementation of EMP, RAP/SMP and include in ESIA report
k. Package wise compliance report after completion of Underground Cabling Works.
l. The reports should include necessary institutional arrangements, construction management plan to ensure environmental, safety, health, resettlement and rehabilitation standards in the project area.
m. Guidelines for proper workmen camps for contractors.
n. Detailed mitigation measures for tree plantation.

3.5 Work Plan and time schedule

The total duration for the completion of the studies and submission of package wise ESIA reports is 5 months from the date of agreement. The Consulting Firm should submit the work plan and the timelines as per the standard format for timely completion of the ESIA studies and submission of final report to APEPDCL. The time schedules for submission of various reports is as follows:

- Inception report shall be furnished within 15 days from the date of agreement.
- Fortnightly progress reports shall be submitted as per the standard format.
- Draft report for First package area shall be submitted within 35 days from the date of agreement.
- Subsequent ESIA reports for the balance 5 packages shall be submitted as detailed below:

ESIA report for	**Due date for submission of report**
Second Package	15 days after first package report approval
Third Package	15 days after second package report
Fourth Package	15 days after third package report
Fifth Package	30 days after fourth package report
Sixth Package	30 days after fifth package report

- After completion of construction work of each of the six packages, the Consulting Firm shall give a compliance report on whether the execution of the work is as per the recommended Environmental Management Plan or not.
- Package wise schedule of expected completion of work is as follows:

Description	Expected date of completion of UG Cabling works	Probable list of 33/11 KV sub-stations & connected network covered in the package
First Package	16-Nov-2017	MVP Colony, Pedawaltair, KGH, RCD Hospital and Siripuram of Zone-1 Division, VSP
Second Package	15-Dec-2017	Pandurangapuram, RK Beach, Ramnagar, Vidyut Sakha, TSR Complex, Dondaparti Indoor and CMR Maddilapalem of Zone-1 Division, VSP
Third Package	17-Jan-2018	Kotha Road, Port, Police Barracks, Outer Harbour, Venkateswarametta and Chitralaya of Zone-1 Division, VSP

Fourth Package	30-Jan-2018	Rushikonda, Adibhatlanagar and Yendada of Zone-3 Division, VSP and Akkayyapalem, Thatichetlapalem, Nakkavanipalem, HB Colony, Rajendranagar and Seethammadhara Water works of Zone-1 Division.
Fifth Package	-	All sub-stations in Zone-2 Division, VSP
Sixth Package	-	All sub-stations in Zone-3 Division, VSP except those covered in Package-4

ANNEXURE 2
Questionnaire for Socio-Economic Survey & Enumeration of Structures within COI

Details of Affected Structure												
S. No.	ID No. Road Number/01	Latitude	Longitude	Road Type (Code)	Type of Structure	Affected Area of Structure			Pole	Tree		Ownership of Property (Code)
						Length	Width	Area	<0.3 mt-1 >0.3mt-2	<0.3 mt-1 (S, M, B)	>0.3mt-2 (S,M,B)	
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
22												
23												
24												
25												

Code

Type of Road: BT-1, CC-2, Mud Road-3, No Road-4

Type of Structure: Ramps-1, Steps-2, Stall/ Shop-3, Pushcart-4, Others (Specify)-5

Ownership of Property: Private-1, Squatter-2, Religious committee-3, Govt department-4

Census/Socio Economic Survey Questionnaire

Date								Road No.	Lane Name
				2	0	1	5		

Investigator Name	Supervisor Name	Respondent Name

A. IDENTIFICATION

A.1 General Identification.										
State		**District**		**Zone**						
A.2 Type of Property										
Private		**Government**		**Trust**		**Community**		**Others**		
1		**2**		**3**		**4**		**5**		
A.3.1 Ownership										
Owner	**1**	**Tenant**	**2**	**Non-Titleholder**	**3**					
A.3.2: If Non-Titleholder:		**1. Encroacher**		**2. Squatter**						
A.3.2 Occupiers Name:				**Son/Wife of:**						
A.3.3 Name, Address, Phone Number and LANDMARK										
A.3.4 If Tenant; Name, Address and Phone Number of the Owner										
A.3.5 Please provide with an ID Proof (Ration card, Voter Id, PAN Card, Driving Licence, any ONE) Record the details:										

B.1 ASSET DETAILS

B.1 Details/Measurement of the Structures: (In mts.)															
Age of Structure	Length:		Breadth:		Area		Type of construction			Typology of structure			Type of Use (Code)	Distance from Edge of the Road
	Total	Affected	Total	Affected	Total	Affected	R	W	F	P	SP	K		
										1	2	3		

Type of Construction :							
Roof		**Wall**		**Floor**		**Boundary**	
RCC/RBC	1	Brick	1	Concrete	1	Brick	1
Thatched	2	Wood	2	Mud	2	Barbed Wire	2
Mud	3	Mud	3	Stone	3	Wood	3
GI / Asbestos	4	Asbestos	4	Wood	4	Others (specify)	9
Bamboo	5	Plastic	5	Others (specify)	9		
Others (Specify)	9	Others (specify)	9				

Type of Use:							
Residential	**1**	Commercial	**2**	Residential cum Commercial	**3**	Open Land/Plot	**4**
Plantation/ Orchard	**5**	Graveyard	**6**	School	**7**	PHC/Hosp./Dispensary.	**8**
Industrial	**9**	Mazar	**10**	Temple	**11**	Masjid	**12**
Church	**13**	Shrine	**14**	Vill Com/ Panchyat/Govt. Land	**15**	Agriculture	**16**
Waste/ Grazing/ Barren	**17**	Others (specify)	**99**				

B2. In case of commercial use, details of business					
Tea Stall	1	Kabari Shop	9	Blacksmith	17
Grocery (Kirana)/General Store	2	Educational Institution	10	Butcher/meat	18
Vegetables/ Fruits	3	Hotel/Restaurant/Motel	11	Barber Shop	19
Cloth/Garments	4	Electrical	12	Medicine Shop	20
Tailor shop	5	Furniture	13	Shoe Maker	21
Pan/ Cigarette Shop	6	Petrol Pump	14	STD PCO	22
Garage/	7	Handicrafts	15	Photocopy shop	23
Lubricant Shop	8	Video parlour/Cyber café	16	Any other, please specify	99

B.2.1 - Ownership	Yes	1	No	2
B.2.2 - If No, how many partners? (In Nos.)				
B.2.3 - How many people have you employed?				
B.2.4 – Do you think excavation in front of your shop will affect your business adversely?	Yes	1	No	2
B.2.5: Where would you prefer to move from here? (Residential and Commercial Both)				

S.No	Place	Where (Specify)	Distance from Current Location
1	Within same locality		
2	Outside the locality		

C.1. HOUSEHOLD DETAILS

C.1.1. Religion	Hindu – 1	Muslim – 2	Sikh 3	Christian 4	Others 9
C.1.2. Caste	ST (hills)	ST (Plain)	SC	MOBC	OBC	General	Others
	1	2	3	4	5	6	9
C.1.3 Name of Tribal Group							

C.1.4. Vulnerability Status	BPL	1	WHH	2		
C.1.5. Type of Family	Nuclear	1	Joint	2	Extended	3
C.1.6. No. of Persons in HH	Above 15 yrs (in nos.)		Below 15 yrs (in nos.)			

C.2. Family Profile. (Start from Head of the Household)

Member Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	
C.2.1 Name													Write names of all persons who live and eat together in this household but exclude persons under the age of 15 years.
C.2.2 Relationship	**HH**												Codes given below
C.2.3 Sex	1	1	1	1	1	1	1	1	1	1	1	1	Male
	2	2	2	2	2	2	2	2	2	2	2	2	Female
C.2.4 Age													**Age on last birthday**
C.2.5 Marital Status	1	1	1	1	1	1	1	1	1	1	1	1	Married
	2	2	2	2	2	2	2	2	2	2	2	2	Unmarried
	3	3	3	3	3	3	3	3	3	3	3	3	Divorced
	4	4	4	4	4	4	4	4	4	4	4	4	Separated
	5	5	5	5	5	5	5	5	5	5	5	5	Widow/Widower
C.2.6 Education	1	1	1	1	1	1	1	1	1	1	1	1	Illiterate
	2	2	2	2	2	2	2	2	2	2	2	2	Primary (class 4)
	3	3	3	3	3	3	3	3	3	3	3	3	Secondary (5 - 10)
	4	4	4	4	4	4	4	4	4	4	4	4	Higher (graduate)
	5	5	5	5	5	5	5	5	5	5	5	5	Technical
	6	6	6	6	6	6	6	6	6	6	6	6	Vocational
C.2.7 Health	1	1	1	1	1	1	1	1	1	1	1	1	Handicap by birth
	2	2	2	2	2	2	2	2	2	2	2	2	Handicapped later
	3	3	3	3	3	3	3	3	3	3	3	3	Chronic illness
	4	4	4	4	4	4	4	4	4	4	4	4	No illness/ healthy

Codes for Relationship

Head of the House Hold	HH	Wife	2	Husband	3	Son	4
Daughter	5	Son-in-law	6	Daughter-in-law	7	Grandfather	8
Grandmother	9	Grandson	10	Grand daughter	11	Grandson-in-law	12
Grand daughter-in-law	13	Brother	14	Sister	15	Brother-in-law	16
Sister-in-law	17	Father	18	Mother	19	Father-in-law	20
Mother-in-law	21	Uncle	22	Aunt	23	Cousin	24
Nephew	25	Niece	26	Any other (specify)			

D.1. EMPLOYMENT STATUS OF THE FAMILY MEMBERS

D.1 Employment Status	1	1	1	1	1	1	1	1	1	1	1	1	Yes
	2	2	2	2	2	2	2	2	2	2	2	2	No
D.2 Occupation (Main occupation)	1	1	1	1	1	1	1	1	1	1	1	1	Agriculture
	2	2	2	2	2	2	2	2	2	2	2	2	Agri Labour
	3	3	3	3	3	3	3	3	3	3	3	3	Non Agri Labour
	4	4	4	4	4	4	4	4	4	4	4	4	Business/Trade
	5	5	5	5	5	5	5	5	5	5	5	5	Govt. Service
	6	6	6	6	6	6	6	6	6	6	6	6	Private Service
	7	7	7	7	7	7	7	7	7	7	7	7	Maid Servant
	9	9	9	9	9	9	9	9	9	9	9	9	Others
D.3 Non-Working Status (Give main reason)	1	1	1	1	1	1	1	1	1	1	1	1	No work available
	2	2	2	2	2	2	2	2	2	2	2	2	Seasonal inactivity
	3	3	3	3	3	3	3	3	3	3	3	3	Household duties
	4	4	4	4	4	4	4	4	4	4	4	4	Old/young
	5	5	5	5	5	5	5	5	5	5	5	5	Handicapped
	6	6	6	6	6	6	6	6	6	6	6	6	Student
	9	9	9	9	9	9	9	9	9	9	9	9	Others
D.4 Income per month	1	1	1	1	1	1	1	1	1	1	1	1	Less than Rs.2000
	2	2	2	2	2	2	2	2	2	2	2	2	Rs.2000 - 3000
	3	3	3	3	3	3	3	3	3	3	3	3	Rs. 3000 - 4000
	4	4	4	4	4	4	4	4	4	4	4	4	Above Rs 4000
D.5 Skills													This may have Multiple answers

D.6: INCOME AND EXPENDITURE

Income			**Expenditure**			
Sources	**In Rupees**		**Items**	**In Rupees**	**Items**	**In Rupees**
Agriculture			Food		Electricity/Utilities	
Commercial			Cooking fuel		Water	
Service (Pvt./Govt.)			Clothing		Social events	
Livestock			Transport		Agriculture (labour/tools)	
Remittance (money order, etc)			Healthcare Medicines		Seeds/fertilizers/pesticides	
Others (Specify)			Education		Others (specify)	
Total					TOTAL	

D.7 PROJECT RELATED INFORMATION

Are you aware of the proposed project	Yes	1	No	2	
If yes what is the source	TV – 1	Newspaper - 2	Govt. officials – 3	Other villagers – 4	Other - 9

Positive impacts perceived		**Negative Impacts Perceived**	
Reduced sufferings during cyclones and adverse climatic conditions	1	Loss of livelihood	1
Improved access to services	2	Loss of access to houses/ businesses	2
Productive use of time	3	Loss of structures/ assets	3
Increase in business opportunity	4	Increase in accidents during and after construction	4
Improvements in quality of life	5	Disruption of utilities such as water, electricity, telephone, cable, etc	5
Others (specify)	9	Others (specify)	9

D.8 REHABILITATION OPTIONS

OWNER	Commercial structure	
What is preferred rehabilitation measure	Cash compensation at replacement cost	1
	Shifting, and rental allowance and training	2
	Others (specify)	9

TENANT	Commercial structure	
What is preferred rehabilitation measure	Shifting, and rental allowance and training	1
	Others (specify)	9

D.10 Provide a hand-sketch drawing indicating the dimensions of the property (Structure/Land) in this blank space along with the land mark)

SIGNATURE

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
		1.	1.	
		2.	2.	
		3.	3.	
		4.	4.	
		5.	5.	
		.		

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature

ANNEXURE 3
Details of Public Consultation along with list of Participants and Photographs

PUBLIC CONSULTATION AT JAUARA PETTA ROAD, LB COLONY SS

Appendix-

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
6/1/2016	R-48- Jauara Petta Road. LB Colony	1. Main feature of UH/cabling project of APDRP 2. Alignment and road conditions 3. Possible impacts on assets and livelihood 4. Compensation provisions Under the projects 5. Grievance Redress Mechanism	1. [illegible] 2. [illegible] 3. [illegible] 4. [illegible] 5. [illegible]	

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
1)	R. NAZLABABU	M.	fisher man	9985226214	
2	P-PARDESH	M	"	9949367176	P-PARDESH
(3)	V. PYDIRAJU	M	"	9963268910	
(4)	R. Nookaraju	M	"	9059608708	
(5)	Pvalayya	M.	"	9985202258	
6,	N. Viswandham	M	"	9394866158	
7,	Ch. Yellaji	M	"	7893459861	
8,	D. Appavoo	M	"	9619792704	
9	O. Appalaraju	M	"	8019411104	
10,	Ch Pydi Patro	M	"	8121382257	
11	V. Nookaraju	M	"	—	L.H. V. Nookaraju
12,	R. Aruna.	F	Business (Tea-Stall)	8466040228.	

PUBLIC CONSULTATION AT FISHERMAN COLONY , LB COLONY SS

PUBLIC CONSULTATION AT WARD NO.- 21 KOTHAGALARIPETA , KGH SS

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
14-01-16	Road No 78	1. Nature and activities of project	1.	
	Ward No 21 KGH Kothagalaripeta	2. problem and Solution	2.	
		3. Positive and Negative	3.	
		4. Impacts if any.	4.	
		5. Impacts on women and children	5.	
			6.	

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
1.	Pilla Thatayyadu	M.	Electrician	9291283630	
2.	Pilla. APPA Rao.	m.		9703027206.	P. AR.
3	R GURUNADHAM	M		8333807590	
4.	P. Raju	M.	V.P.T.	9642440916	
5.	P. Venkata Lakshmi	F	House wife.	—	
6	S. Appala Raju	M		9642596806	S. Appala Raju
7	N. Siva Vara Rao	M	PLOT OWNER	9848842287	N. S Rao.
8	Ch. Satyanarayana	M	Auto	8142308870	Ch. Satyanarayana
9.	G. Chiranjeevi	M	Student	9550662004	G. Chiranjeevi
10	K. Jagadish	M	Student	7799439939	
11	S. Rama Krishna	M	Car driver	8142966676	S. Ramakrishna

PUBLIC CONSULTATION AT WARD NO-21 , KGH SS

PUBLIC CONSULTATION AT RAJKA STEET, CHINNA WALTAIR, PEDAWALTAIR SS

Appendix-

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
02/01/2016	R 91, 90	1. Alignment route map of UG Cabling	1. [illegible]	[illegible]
	RAJKA STREET (CHINNA WALTAIR) PEDA WALTAIR	2. Negative impacts, positive impacts 3. if any envisaged by the community 4. Suggestion if any. 5. Grievance Redress Procedure 6. Provision and policy of compensation.	2. [illegible] 3. [illegible] 4. [illegible] 5. [illegible]	[illegible]

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
1	P. Satya Murali (Street President)	M	Private Job	96421-92641	
2	R. Para Rao.	M.	Chemyeur.	9848230185	
3.	P. Hanumantha Rao	M	Private Job	9573170925	
4.	N. Venu	M.	Private Job	8977582295	
5.	Annapurna	F	House wife	9010636972	
6	S. Vineeth Kumar	M	student	9154720796	
7.	R. Venkateswara Rao	M	Private Job	9492293155	
8.	R. Laxmi	F	House wife	9493330815	
9.	M. Suresh.	M	(MRF Tyres) Sales	9177698919	
10.	P. Kanta Rao	M	(ZTBOCO) Sr.	-	

PUBLIC CONSULTATION AT RAJKA STREET , CHINNA WALTAIR, PEDAWALTAIR SS

PUBLIC CONSULTATION AT RAJKA STEET, CHINNA WALTAIR, PEDAWALTAIR SS

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
7.01.2016	169	1. About the project APDRP	1. [illegible]	
		2. Route alignment of proposed	2. [illegible] 400 [illegible]	
		3. Trench	3. [illegible] BPL [illegible]	
	Polammba Temple	4. Positive impacts envisaged	4. [illegible]	
		5. by the Vendors-	5. [illegible] 400 [illegible]	
		- Negative impacts due to	[illegible]	
		project	[illegible]	
		- Mitigation Measures and	[illegible]	
		suggestions	[illegible]	
			[illegible]	

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
1	P. [illegible]	M	Business	9866868524	P. Ramachandrarao
2	T. [illegible]	M	"	9701676256	T. [illegible]
3	V. [illegible]	M	[illegible] ([illegible])	9298600819	V. K[illegible]swaRaRao
4	K. [illegible]	M	Business	7386462222	[illegible]
5	I. [illegible]	M	"	9676665493	I. [illegible]
6	[illegible] [illegible]	M	"	9866653597	B [illegible]
7	B. [illegible]	M	"	9666255155	B. ATChi babu
8	B. [illegible]	M	"	8790624440	B. Bhaskar
9	B. [illegible]	M	"	9000556551	B. [illegible]
10	[illegible] [illegible]	M	"	9866653597	[illegible]
11	L. [illegible]	M	"	9705307045	L. GovindaRao
12	[illegible] [illegible]	M	"	9533482895	[illegible]
13	P. [illegible]	M	"	9052544497	P. [illegible]
14	G. [illegible]	M	"	9912993129	[illegible]
15	T. [illegible]	M	"	7386693372	T. [illegible]
[illegible]	K [illegible]			9704307943	K[illegible]

PUBLIC CONSULTATION WITH BUNDY OWNERS AT ROAD169, POLAMMBA TEMPLE

PUBLIC CONSULTATION AT RILIVIRI STEET, CHINNA WALTAIR, PEDAWALTAIR SS

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
2-01-2016	R 25, 26, 27, 28, Underground cabling and APDRP	1. Manual Digging will be more appropriate to save property or minimize the impacts on narrow streets		
	Street Rolivisi (CHINNA WALTAIR) PEDA WALTAIR	2. Alignment route map on ground.		
		3. Negative impacts envisaged by the community		
		4. Posiline impacts if any.	2. No problem in shifting the belongings on the alignment	
		5. Gender related issues like impact on cookings, livings and transportation.	3. No loss of any kind of business.	
		6. Policy of compensation	4. Benicade should be done Property.	
		7. Grievance Redress Mechanism	5. the sewer line need to protected	
			6. Street lights must be restored.	

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
1.	CHENNA GOWRISHANKAR	M	Faculty (Teaching) President Adagini	9581263698	Ch. Gowri 02/01/16
2	B. Pramila	F	Housewife	9052202903	B.ప్రమీల
3	A Rathan.	F	House wife	9849364841	A రత్తన్
4	A. Kishore Kumar	M	Office Boy	9849364841	A. Kishore Kumar
5.	Ch Raghavamma	F	House wife	9949776137	Ch Raghavamma
6	A. AJAY	M	Private Job.	9985166443	A. Ajay
7.	K. Rajesh Kumar	Male	Government	9885819588	K. Rajesh Kumar
8	K. Padhamma	F	House wife	—	K పద్మ
9.	A. THANUJA	F	Hous wife	9985117727	A. Thanuja
10.	Y రమేష్ (Y. Ramesh)	M	AU Daily worker.	9177968801	Y రమేష్

PUBLIC CONSULTATION AT RILIVIRI STREET , CHINNA WALAIR, PEDA WALTAIR SS

PUBLIC CONSULTATION AT APPUGHAR MVP SS

PUBLIC CONSULTATION WITH LOCAL PEOPLE

Date	Road Number / Lane Name	Issue Discussed	Suggestion given by local people	Remarks if any
5/01/2016	R-204. MVP ADPUGHAR	1. Feature of UN/Cabling project under APDRP	1. ① ఉప్పెన గాలికి రాకుండా కారణం	
		2. Alignment route and Design	2. చెట్టు కొమ్మలు, కొబ్బరి మానులు	
		3. Possible negative impacts	3. వి. వస్తుంది తప్పుతుంది.	
		4. Positive impacts of UN/cab project	4. ② ట్రాన్స్ ఫార్మర్ కి ఎటువంటి [illegible]	
		5. Compensation provision under the project	5. వుండదు. జాగ్రత్తగా ఉండాలి.	
		6. GRC Mechanism.	③ [illegible] ఎటువంటి [illegible]	
			పని జరిగిన తరువాత కూడా ఎటువంటి	
			ఎటువంటి [illegible] ఉండవు.	
			④ చిన్న పిల్లలకు ఇబ్బంది లేకుండా	
			[illegible] [illegible] [illegible] [illegible]	
			చూడాలి.	
			⑤ గోతులు తవ్విన తరువాత	
			గోతులు [illegible] వేసి [illegible]	
			వేయాలి.	

ATTENDANCE SHEET OF PUBLIC CONSULTATION

S. No.	Name of person	Sex	Occupation	Phone Number	Signature
(1)	R. YELLAYYA	M	DAILY-LABOURER.	NO-PHONE.	ఆర్. యల్లయ్య
(2)	U. YELLAMMA	F	HOUSE-WIFE	—	ఆర్. యల్లమ్మ
(3)	V. PADMA	F	HOUSE-WIFE	9963972624.	V. padma
(4)	R. ADHI	F	HOUSE-WIFE	—	R లక్ష్మి
(5)	R. Ramulamma.	F	HOUSE-WIFE	—	R. రాములమ్మ
(6)	V. Yellamaji	F	HOUSE-WIFE	—	V యల్లమ్మ
(7)	B. UMA	F	HOUSE-WIFE	—	B.ఉమ
(8)	V. Maleswari	F	HOUSE-WIFE.	—	V. malleswari
(9)	K. Rama Rao (President)	M	WARD President.	9502133209	K. Rama Rao
(10)	K. Gurraja (President) ex	M	ward president	9908743548	K. Gurraja
(11)	K. Dasama	F	HOUSE WIFE	—	K దాసమ్మ

PUBLIC CONSULTATION AT APPUGHAR SHIVALAYAM, MVP

ANNEXURE 4
Detailed Breakup of Budgetary Provision for ESMP Implementation & Monitoring

Detailed Break-up of ESMP Costs for Package 1 - REN/UG Project under APDRP		
S.No. (as per Table 9.2)	**Item Particulars**	**Total Amount (Rs)**
A	**ESTIMATED COSTS FOR IMPLEMENTATION OF EMP**	
1	**Minor Repairs to Footpaths/Steps**	
a	Using 1:4:8 PCC (1m x 1m 0.025m thick)	0.025 cu.m required/sq.m area
	Cost of 1:4:8 PCC	Rs. 4000/cu.m
	Cost of 1:4:8/sq.m	Rs. 100/sq.m
b	Using Cement Mortar (1:6) 20 mm thick	
	Cost of 1:6 Cement Mortar/sq.m	Rs. 185/sq.m
c	Total Area (approx)	100kms of footpath x 2m wide x 0.05 % area
		10000 sq.m
	Rate	Rs. 150/sq.m
	Total Cost	**10000 x 150**
	say	**15 Lacs**
3	**M.S. Fabricated Barricading**	
	Total Length of Cable Trench for Barricading	150 kms out of 165 kms
	Total Length of Barricade required Assuming works are taken up at 10 locations	10 x 500m x 2 (sides)
		10000m
	Providing Barricade of each size	2.5 m long x 2m height
	Total no.of Barricade required	10000/2.5
		4000 nos
	Cost of each Barricade (include material & fabrication)	Rs. 16500
	Total Cost of Barricade	4000 x 16500
		6.6 crores
	Considering only 60% of cost is charged to a package balance being residual value	**3.96 crores**
7	**Provision of PPEs for Work Force**	
	Total no. of persons per location	30
	Total no of locations	10
	Total no. of Work force	300
	PPE Cost	Rs. 3000/person
	Total cost/instance	Rs. 90000
	Periodic Renewal	3 times over 24 months
	Cost	Rs. 2700000
	Contingency	say 300000
	Total cost/instance	**30 Lacs**
9	**Water Tankers for Dust Suppression Measure**	
a	Fabrication cost of M.S. water tankers of 6000ltr capacity on wheel mounted chassis with accessories for motorised pressurised spray with 500 m hose	
i	Fabrication cost of M.S. water tankers of 6000ltr capacity on wheel mounted chassis with accessories for motorised pressurised spray with 500 m hose	Rs. 6/ltr
	Cost	6000 x 6

		Rs. 36000
ii	Chassis & other accessories	Rs. 40000
iii	Cost of Hose	Rs. 300/m
	Cost	300 x 500
		Rs. 15000
	total Cost of each Tanker	Rs. 91000
	Total no.s required for 10 locations	10
	Total Cost	Rs. 910000
b	Cost of water filling	
i	Water required	6000 ltr/km of cable length
ii	Total Tankers of Water required	165 nos
iii	Cost of water/tanker	Rs. 3000
iv	Total Cost of Water for 165 kms	165 x 3000
		Rs. 495000
	Total Cost a + b	**1405000 say 14 Lacs**
12	**Safe Disposal of Road Cut Bitumenn Materials at GVMC Approved Locations**	
	Total Quantity	1.5 m wide x 150 km road length x 50mm thick
		11250 cu.m of Bitumen Material
	Disposal by truck	6 cu.m/truck
	No. of Truck loads	7500/6
		1875 truck loads
	Cost/truck loads with a load distance of 20kms	Rs. 3000/truck load
	Total cost of carriage	3000 x 1875
		Rs. 5625000
	say	**56.25 Lacs**
14	**Deployment of Traffic Wardens at Junctions**	
	No. of Persons/location/12 hour shift	2
	Duration	6 weeks x 7 days
	No. of Locations	10
	Total Mandays	8400 mandays
	Cost	600/manday
	Total cost	5040000
	say	**50 Lacs**
15	**Installation of Caution/Public Notice Boards**	
	No. of Boards required	6 Boards/Segment
	Total Segment	330 segment of 50m /segment
	Consdering each board can be re-used for max 5 times	
	Total Boards required	6 x 330/5
		396 no.s
		say 400
	Total Cost @ Rs. 3000/Board	**12 Lacs**
17	**Environmental Monitoring (Both Air & Noise) through 3rd party agencies/laboratory approved by APPCB**	
	No. of Locations	10 Locations spread across package

	Frequency & Duration of Monitoring	4 times/Year for 2 Years to cover both pre & during/post works
	Total No.of Samples	10 x 4 x 2x 2
		160 samples
	Cost of 160 Ambient Air Quality Samples @ Rs. 10000/sample	160000
	Cost of 160 Ambient Noise Level Monitoring @ Rs. 2000/sample	320000
	Total Cost of Monitoring	1920000
	Add Transportation & Misc Expenses	600000
	Total	**25 Lacs**
18 & 19	**ESMP Implementation Monitoring thorugh 3rd Part Auditor (24 months duration for Package 1 completion)**	
	Manpower	
i	Sr. Environmental & Social Expert	
	12 months over 24 months period/package @ 250000	3000000
ii	1 Sr. Resident Environmental & Social Expert @ 50000/month for 24 month	1200000
iii	2 Jr. Resident Environmental & Social Officer @ Rs. 30000/month for 24 Months	Rs. 1440000
iv	1 office assistant for data entry & reports preparation @ 15000/month for 24 months	360000
v	1 vehicle for 24 months @ Rs. 30000	720000
vi	2 vehicle expense reimbursement for Jr. officer @ 3000/vehicle/month	144000
vii	Add 30% overheads & profit of agency	20.59 lacs
	Total	89.23 Lacs
		say 90 Lacs
Breakup of Cost for Ressetlement Action Plan		
B	**Estimated Costs for Resettlement Action Plan Implementation of RAP as per Entitlement of Provisions of ESMF under APDRP**	
20a	Restoration of ramps in cement concrete of M15 Grade and Brick masonary as required per site condition as replacement cost of structures for non-title holders	2400 cu.m @ Rs. 5000/cu.m
	Cost	2400 x 5000 = Rs. 12000000
	say	**120 Lacs**
20b	Restoration of steps in cement concrete of M15 Grade and Brick masonary as required per site condition as replacement cost of structures for non-title holders	60 cu.m @ Rs. 5000/cu.m
	Cost	60 x 5000 = Rs. 300000
	say	**3 Lacs**
20c	Replacement cost of Other Structures (part of boundary walls, kiosk's shop, base of handpump, signages etc.)	215 cu.m @ Rs. 5000/cu.m
	Cost	215 x 5000 = Rs. 1075000
	say	**10.75 Lacs**
	Sub Total	**133.75 Lacs**
	Add 50% as Contingency Cost to account for incidental damages	**200.625 say 200 Lacs**
	Total Cost	**200 Lacs**

C	**Subsistence Allowance to Squatters (One Time)**	
21	One time grant of Rs 30000 as Subsistance Allowance for Squatters	
	No. of Squatters	66
	Cost	**66 x 30000 = Rs. 1980000**
	say	**20 Lacs**
22	One time grant of Rs. 25000 for loss of livelihood to all commercial squattrers	
	No. of Squatters	97
	Cost	**97 x 25000 = Rs. 2425000**
	say	**24 Lacs**
23	Training Assistance of Rs 10,000/- for income generation	
	No. of Tranees	36
	Training Cost	36 x 10000 = Rs. 360000
	say	**3.6 Lacs**
	Total Cost	**47.65 say 48 Lacs**
D	**Break up Cost for Implementation of RAP**	
24	Training of PIU Staff on RAP	1 Lac
25	Hiring of NGO (for package 1 of REN/UG Cabling Project) over 24 months to implementation supervision of RAP	50 Lacs
26	Hiring of agency for M & E of RAP implementation	15 Lacs
	Total	**66 Lacs**
	Total Cost of ESMP (A+B+C+D)	610.21 Lacs say 610 Lacs
	Contingency@ 5 % of Total Cost	30.5 Lacs
	Grand Total	**640.50 Lacs**