

Initial Environmental Examination: Project 1

Distribution System Improvement

June 2014

Sri Lanka: Green Power Development and Energy Efficiency Improvement Investment Program

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ABBREVIATIONS

ADB	–	Asian Development Bank
CCD	–	Coast Conservation Department
CEA	–	Central Environment Authority, Government of Sri Lanka
CEB	–	Ceylon Electricity Board
DC or D/C	–	double circuit
DPR	–	detailed project report
DSD	–	Divisional Secretariat Divisions
EA	–	executing agency
EARF	–	Environmental Assessment and Review Framework
EIA	–	Environmental Impact Assessment
EMoP	–	Environmental Monitoring Plan
EMP	–	Environmental Management Plan
EHV	–	extra high voltage
GHG	–	greenhouse gas
GND	–	Gram Niladhari Divisions
GoSL	–	Government of Sri Lanka
GRC	–	Grievance Redress Committee
GRM	–	Grievance Redress Mechanism
IA	–	implementing agency
IEE	–	Initial Environmental Examination
LILO	–	line-in-line-out
MFF	–	multitranches financing facility
MOPE	–	Ministry of Power and Energy
PAA	–	Project Approving Authority
NARA	–	National Aquatic Resources Research & Development Agency
PCB	–	polychlorinated biphenyl
NEA	–	National Environmental Act
PIU	–	project implementing unit
PMU	–	project management unit
PRDA	–	Provincial Road Development Authority
PUCSL	–	Public Utility Commission of Sri Lanka
REA	–	Rapid Environment Assessment
ROW	–	right of way
RP	–	Resettlement Plan
SC or S/C	–	single circuit
SF ₆	–	sulphur hexafluoride
SPS	–	Safeguard Policy Statement

WEIGHTS AND MEASURES

ha (hectare)	–	unit of area
km (kilometer)	–	1,000 meters
kV	–	kilovolt (1,000 volts)
kW	–	kilowatt (1,000 watts)
MW	–	megawatt

NOTE(S)

In this report, "\$" refers to US dollars.
"SLRs" refers to Sri Lankan rupees

EXECUTIVE SUMMARY

1. Asian Development Bank (ADB) is proposing to extend USD 460 million loan to Sri Lanka's power sector for green energy power development and energy efficiency improvement to Ceylon Electricity Board (CEB) with a focus to identify the transmission and distribution projects for evacuation of renewable energy (wind and solar) parks/ projects and overall improvement of network efficiency.
2. The distribution components of the Green Power Development and Energy Efficiency Improvement Investment Program include:
Component C: Distribution projects.
 - C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km);
 - C.II. 33 kV Thalankuda Gantry;
 - C.III. 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km);
 - C.IV. 33 kV Kaluwanchikudy Gantry;
 - C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km);
 - C.VI. 33 kV Urani Gantry;
 - C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km);
 - C.VIII. 33 kV Karadiyanaru Gantry;
 - C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);
 - C.X. 33 kV Bowatte Gantry; and
 - C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry.
3. The selected 250-300 sq.m. plots of land required for gantry based switching stations for Thalankuda, Kaluwanchikudy, Urani, Karadiyanaru and Bowatte will be based on government lands and no acquisition of land will be required from the surrounding communities. CEB will get the land (0.03 Ha) transferred from the Divisional Secretaries.
4. The 33 kV distribution lines – 21 km Vavunathivuv GSS to Thalankuda line traverses 90% through paddy fields, barren land and the rest through home gardens, marsh lands and a lagoon near Manmunai bridge. The 27 km line from Vavunathivu GSS to Kaluwanchikudy gantry traverses through paddy fields, marshlands, and barren land. The 6 km Vavunathivuv GSS to Urani gantry traverses through paddy fields, marshlands, lagoon, abandoned lands and home gardens. Temporary impacts are foreseen on loss of crops during construction and loss of some trees (133) is also anticipated. The 13 km Vavunathivuv GSS to Karadiyanaru line traverses mainly through paddy fields, barren land and home gardens. Temporary impacts are foreseen on loss of crops during construction and loss of some 47 fruit trees and 138 non-fruit trees is also anticipated. The 20 km Madampe GSS to Bowatte line traverses through paddy fields, coconut plantations, few home gardens, marshes and water. The line crosses the main roads and minor roads in 18 places. It also crosses the high tension lines in 13 places. Forest trees (117) and fruit trees (173) in ROW have to be removed during the construction of line. The 5.3 km Wellampitiya to Ambathale Gantry line traverses through densely populated area along the low level road Avissawella to Colombo. The line runs parallel to the A4 highway. For all the above sub-projects, no wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW.
5. Impacts are manageable and can be managed cost effectively - Environmental impacts are likely to result from the proposed project development. Careful mitigation and monitoring, specific selection criteria and review/assessment procedures for subprojects have been specified to ensure that minimal impacts take place. The detailed design would ensure inclusion of any such environmental impacts, that could not be specified or identified at this stage, are taken into account and mitigated where necessary. Those impacts can be reduced through mitigation measures such as correction in work practices at the construction sites, or through the careful selection of sites.

6. The proposed project will have number of positive impacts and negative impacts to the existing environment as follows:
 - Significant improvement of the quality and reliability of the electricity supply to the project affected area according to current demand is the main positive impact.
 - Removal of trees for the distribution line is the main negative impact to the proposed project area.
 - Environment pollution due to cut and fill operations, transportation of construction materials, disposal of debris, disturbance to the farming activities, nuisance from dust, noise, vehicle fumes, black smoke, vibration etc. due to construction activities are the short term negative impacts due to proposed project.
 - There will be loss of agricultural productivity due to obstruction and reduce the land of paddy fields as well as cutting of home gardens, coconut and rubber plantations; which will be compensated based on established rates by CEB.
7. Benefits far outweigh negative impacts - The proposed project will improve operational efficiency and quality of power, voltages, reliability of the system and at the same time will reduce losses. Supply of power to both the local areas and regions will boost economic development of the area by strengthening the power distribution infrastructure. Overall, the major social and environmental impacts associated with distribution projects are limited to the construction period and can be mitigated to an acceptable level by implementation of recommended measures and by best engineering and environmental practices.
8. Various mitigation measures to be taken prior to the project activities are listed in the project's IEE. Potential adverse environment impacts associated with distribution lines has been avoided or minimised through careful route selection. The alignment is sited away from major settlements, whenever possible, to account for future urban expansion. Forests areas and thick vegetation areas are avoided wherever possible; however, route alignment passes through scrub-lands, cultivated paddy fields, rubber cultivations, rubber plantations, tea cultivations etc. The lines will also pass through degraded forest areas but avoid any national park or sanctuary. The alignments in this project have also avoided wetlands and geologically unstable areas, which can also pose foundation related problems. Government land will be used for all proposed gantry based switching stations but no land will be acquired for placing distribution towers on private land. However, physical damage to the crops during the construction phase of the project will be compensated at the time of damage as per GoSL norms. Associated impacts on agricultural land will be restricted to the construction phase and will be temporary in nature. Agricultural land will not be lost permanently at the base of the distribution tower. After construction, agricultural land within the distribution corridors can be used again for farming purpose.
9. Since the project does not involve activities that have significant adverse impact, an initial assessment been done to determine the extent of impact as per the ADB's new Safeguard Policy Statement 2009 guidelines. Although the overall Tranche 1 environment category is "A" due to other projects, the environmental classification for this sub-project component "C" is "Category B". The IEE report conforms to the Ministry of Environment and Natural Resources guidelines and regulations and are consistent with ADB Operations Manual F1/BP and F1/OP (2003), ADB's Draft Good Practice Sourcebook, December 2012 and the ADB's Safeguard Policy Statement 2009.

1.0 INTRODUCTION

1.1 Background

1. Sri Lanka has experienced high economic growth in the recent past. With the end of civil conflict in 2009, the country requires sustained focus on post-conflict infrastructure development to remove disparities in economic and social status of the poorer Eastern and Northern provinces. Asian Development Bank's (ADB) focus on development of power sector infrastructure in partnership with other development partners, contributes to the provision of reliable, adequate, and affordable power supply for sustainable economic growth and poverty reduction in Sri Lanka.

2. The power sector has undergone significant policy level and structural changes in the recent past:

- Sri Lanka Electricity Act passed in parliament in 2009;
- Assumption of the role of electricity regulator in April, 2009 by the Public Utilities Commission of Sri Lanka (PUCSL);
- Creation of Functional Business Units (FBU's) within the CEB with one unit each for generation and transmission and 4 geographical units for distribution function; and
- All FBU's have been issued licenses by the Public Utilities Commission of Sri Lanka (PUCSL) and they have been filing the tariff petitions since 2010.

3. Sri Lanka's electricity industry is managed by the Ministry of Power & Energy (MoPE). All electricity utilities remain under direct or indirect state ownership, whereas, there is significant private sector participation in power generation. The institutions listed in **Table 1** are active in the electricity industry whereas **Table 2** lists the regulatory and facilitation agencies in Sri Lanka.

Table 1: Institutions in the energy supply industry

Institution	Functions and other information
Government	
Ministry of Power and Energy (MOPE)	Energy policy, project implementation and monitoring, supervision of state-owned electricity utilities.
Ministry of Petroleum and Petroleum Resource Development (MOPPRD)	Petroleum industry project implementation and monitoring, supervision of state-owned petroleum corporation, petroleum resource development and exploration.
Electricity utilities	
Ceylon Electricity Board (CEB)	State-owned corporation, engaged in power generation (one license, 23 power plants), transmission (one license), and distribution (four licenses, about 4.5 million customers).
Lanka Electricity Company (Pvt) Ltd (LECO)	State-owned company, engaged in power distribution (one license, 450,000 customers) along western and southern coastal regions.
Independent Power Producers (IPPs)	
Ten thermal IPPs to grid, two thermal IPPs in Jaffna mini-grid	Each IPP an individual company, eight diesel power plants and two combined cycles on the main grid, two diesel power plants on the Jaffna mini-grid.
About 100 small renewable energy IPPs (also known as Small Power Producers, SPPs)	Each SPP an individual company, small hydro (about 95), rice-husk (2), and waste-heat (1).
About 300 community small hydro-based distribution cooperatives	About 5000 households are served, in total.
About 120,000 solar home systems	Serving an equal number of households.

Table 2- Regulatory and Facilitation Agencies

Institution	Functions and other information
Sri Lanka Sustainable Energy Authority (SEA)	Policy, promotion and regulatory functions of (i) renewable energy (ii) energy efficiency, and (iii) energy planning, (iv) energy fund management.
Public Utilities Commission of Sri Lanka (PUCSL)	Infrastructure regulatory commission presently empowered to regulate (i) electricity industry (ii) bunker and lubricating oil industries. In future, Petroleum Industry regulation is likely to be assigned to PUCSL.

4. Ceylon Electricity Board (CEB) is a corporate body established for development and coordination of the generation, transmission, and distribution of electrical energy in Sri Lanka. It holds six separate licenses for these activities. The license for generation division caters for 66% of the power to the grid. The transmission network consists of 55 GSS (132/33 kV, 220/132/33 kV, 220/132 kV and 132 /11 kV) and 2,236 km of HV Lines (both 220 kV and 132 kV) approximately.

5. The island is divided into four regions for power distribution, supply and sales, where each distribution division holds a license. These distribution licenses cover more than 97% of the geography of Sri Lanka. Lanka Electricity Company Ltd. (LECO), which is a subsidiary of CEB, covers the remaining areas catering to 478,500 customers. Electricity Distribution Network of CEB consists of MV lines (33 kV and 11 kV), primary substations (33 kV/11 kV), distribution substations (33 kV/400 V and 11kV/400 V), and LV lines (400 V).

6. ADB is proposing to extend USD 440 million loan (including USD 60 million in co-finance) to Sri Lanka's power sector for green power development and energy efficiency improvement. The specific focus of this assistance is to identify the transmission and distribution projects which could be funded through the proposed loan. The projects identified for the ADB financing are focused on evacuation projects for renewable energy (wind) parks/ projects and overall improvement of energy efficiency.

7. The proposed project will assist GoSL to develop a least-cost project implementation of the following project components:

- (i) Hydropower generation developed and connected to the grid in the Central Province - this includes a 30 MW, run-of-river hydropower station at Moragolla in the Central Province¹ including a 132 kV associated transmission infrastructure to connect the station to the grid that will increase clean and low cost base load power generation.
- (ii) Transmission infrastructure capacity for absorbing increase in power demand and future renewable generation capacity enhanced - this comprises the construction and augmentation of a 220/132 kV and 132/33 kV grid substations and 220 kV and 132 kV transmission lines in Eastern, Northern, North Central, North Western, Southern, Western and Uva provinces that will absorb increase in power demand and ensure system's stable operation with addition of intermittent wind and solar generation.
- (iii) Efficiency of medium voltage network improved - this involves the construction of 33 kV lines and reactive power management through installation of switched capacitor banks in the MV network to address overloading of conductors, voltage drop in MV lines and poor power factor.
- (iv) Demand-side management for energy efficiency improved - demand-side management (DSM) interventions will be introduced, resulting in energy savings (e.g. efficient lighting, improved domestic metering, and use of smart grid technologies).
- (v) Capacity development support provided to CEB - the investments will be reinforced by financing for non-physical capacity development components including: (a) energy efficiency related institutional capacity of CEB, (b) preparation of new sub-projects (for the second tranche), and (c) implementation supervision.

1.2 Scope of Work and Methodology Adopted

8. The broad scope of the Environmental Assessment study is:
- i. To conduct field visits to collect data relevant to the study area and also collect secondary data so as to establish the baseline environmental status of the study area;
 - ii. To assess the impacts on environmental attributes due to the location, design, construction and operation of the proposed project;
 - iii. To prepare a mitigation plan outlining the measures for protecting the environment including institutional arrangement and environmental monitoring;
 - iv. To identify critical environmental attributes required to be monitored subsequent to the implementation of the proposed project;
 - v. To carry out consultation with local people so as to identify the public perception of the project; and
 - vi. To establish the Environment Monitoring Plan (EMoP) for the CEB to submit environmental monitoring reports to ADB at regular intervals.

¹ The detailed engineering design of this hydropower station, including safeguard assessments and preparation of relevant bidding documents, is included in the scope of Loans 2733/2734(SF)-SRI: Sustainable Power Sector Support Project and is expected to be completed by December 2013.

9. This report is prepared on the basis of survey, field study and with the help of available secondary data. The alignment of line may slightly vary after the exact demarcation of tower location. Accordingly, the field surveys were undertaken to assess physical and biological environment. Detailed assessment of the baseline environment has been conducted for the distance up to 500 m on the either side of proposed alignment and data collection from secondary source has been done to support the findings of the field survey. The field studies were supported by data collected from secondary sources such as internet, forest atlas.

10. The IEE report comprises baseline data on existing physical, ecological, economic, and social condition, together with the anticipated environmental impacts and proposed mitigation measures. Observations were made through transect walk along the distribution line tower locations, as well as in and around the proposed premises for new gantries from 01 November 2013 to 30 January 2014. Public consultations were held with the project affected communities, stakeholders, and government officers that relate to existing environmental conditions around the transmission lines and substations and the potential impacts that could happen due to project implementation. In addition, secondary data was collected from published data from GoSL documents, 2001 population census statistics data, as well as from authorities such as CEB, MoPE and other departments.

11. Based on the CEA (Central Environmental Authority) Guidelines of GoSL, the proposed transmission projects are categorised as “prescribed; but the distribution projects are not covered in this category. However, an initial assessment has been done in this report to determine the extent of impacts as per the ADB’s Safeguard Policy Statement 2009. This IEE report conforms to the Ministry of Environment and Natural Resources guidelines and regulations and are consistent with ADB Operations Manual F1/BP and F1/OP (2003), ADB’s Draft Good Practice Sourcebook, December 2012 and the ADB Safeguard Policy Statement (SPS) 2009.

12. Although the overall environment category for Tranche 1 projects is Category ‘A”, the environmental classification for the sub-project component C is “Category B” and does not require an EIA.

1.3 Applicable Environmental and other Legislations

13. A large number of recurrent and non-recurrent activities under establishment of transmission lines and substations are presently not covered by the National Environmental Act (NEA). **Annexure 1** indicates the applicable laws and regulations, which are necessary for the proposed project activities.

2.0 DESCRIPTION OF THE PROJECT

2.1 The Project

14. The distribution components of the Green Power Development and Energy Efficiency Improvement Project consists of:

Component C: Distribution Projects.

- C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km);
- C.II. 33 kV Thalankuda Gantry;
- C.III. 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km);
- C.IV. 33 kV Kaluwanchikudy Gantry;
- C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km);
- C.VI. 33 kV Urani Gantry;
- C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km);
- C.VIII. 33 kV Karadiyanaru Gantry;
- C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);
- C.X. 33 kV Bowatte Gantry; and
- C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry

15. To improve medium voltage (MV) network efficiency and provide system capacity to cater for load growth: Construction of these express lines provide virtual power injection points to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while also improving the system operation flexibility.

C.I-II. Vavunathivu - Thalankuda 33 kV.

C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km);

16. This project will connect the existing MV system in Thalankuda area in the Eastern Province (EP) to Vavunathivu Grid Substation (scheduled for commissioning in 2014). Load growth in the EP is forecast at an average 9% over ten year planning period. Electrification ratio (2012) for EP is 79.8% and energy loss in the MV system is 4.21%.

C.II. 33 kV Thalankuda Gantry.

17. The proposed 33kV switching gantry at Thalankuda (EP) will connect the above backbone line from Vavunathivu Grid Substation to the existing MV system in the area, and improve the operational flexibility of the MV system.

C.III-IV.Vavunathivuv - Kaluwanchikudy 33 kV.

C.III 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km);

18. This project will connect the existing MV system in Kaluwanchikudy area in the Eastern Province (EP) to Vavunathivuv Grid Substation (scheduled for commissioning in 2014). Load growth in the EP is forecast at an average 9% over ten year planning period. Electrification ratio (2012) for EP is 79.8% and energy loss in the MV system is 4.21%.

C.IV 33 kV Kaluwanchikudy Gantry.

19. The proposed 33kV switching gantry at Kaluwanchikudy (EP) will connect the above backbone line from Vavunathivuv Grid Substation to the existing MV system in the area, and improve the operational flexibility of the MV system.

C.V-VI. Vavunathivu - Urani 33 kV

C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)

20. This project will connect the existing MV system in Urani area in the Eastern Province (EP) to Vavunathivuv Grid Substation (scheduled for commissioning in 2014). Load growth in the EP is forecast at an average 9% over ten year planning period. Electrification ratio (2012) for EP is 79.8% and energy loss in the MV system is 4.21%.

C.VI. 33 kV Urani Gantry.

21. The proposed 33kV switching gantry at Urani (EP) will connect the above backbone line from Vavunathivuv Grid Substation to the existing MV system in the area, and improve the operational flexibility of the MV system.

C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.

C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km)

22. This project will connect the existing MV system in Karadiyanaru area in the Eastern Province (EP) to Vavunathivuv Grid Substation (scheduled for commissioning in 2014). Load growth in the EP is forecast at an average 9% over ten year planning period. Electrification ratio (2012) for EP is 79.8% and energy loss in the MV system is 4.21%.

C.VIII. 33 kV Karadiyanaru Gantry.

23. The proposed 33kV switching gantry at Karadiyanaru (EP) will connect the above backbone line from Vavunathivu Grid Substation to the existing MV system in the area, and improve the operational flexibility of the MV system

C.IX-X. Madampe - Bowatte 33 kV.

C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km)

24. This project will connect the existing MV system in Bowatte area in the North Western Province (NWP) to existing Madampe Grid Substation. Load growth in the NWP is forecast at an average 7% over ten year planning period. Electrification ratio (2012) for NWP is 82% and energy losses in the MV system are 1.7%.

C.X. 33 kV Bowatte Gantry.

25. The proposed 33kV switching gantry at Bowatte (NWP) will connect the above backbone line from Madampe Grid Substation to the existing MV system in the area, and improve the operational flexibility of the MV system.

C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry

26. This is an existing single circuit 33 kV distribution line in the Colombo area.

2.2 Type of Project

27. The proposed Vavunathivu GSS was funded under a previous ADB loan and is yet to be constructed. The project implementation will lead to development of distribution projects, which involve distribution of power from green power sources and overall energy efficiency improvement. CEB's distribution planning wing has identified a list of projects, based on the Long term Distribution Development Plan, which are critical for the overall development of the power system. Considering the requirements of Sri Lanka's power system with medium to long term, the prioritization of projects for the proposed loan has been undertaken based on following principles for sequence of preference criteria for distribution projects:

- (i) Medium Voltage network loss reduction and voltage improvement projects.
- (ii) 33 kV distribution express feeders.
- (iii) 33 kV distribution network strengthening for voltage improvement

2.3 Justification for the Project

2.3.1 Vavunathivu - Thalankuda 33 kV

28. Construction of this express line provides a power injection at Thalankuda to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while improving the system operation flexibility. MV Tail end line voltage before and after implementing this proposal is 83.5% and 96.9% respectively. The estimated annual energy savings is 1,835 MWh. About 31,176 consumers would benefit from this project.

2.3.2 Vavunathivuv - Kaluwanchikudy 33 kV.

29. Construction of this express line provides a power injection at Kaluwanchikudy to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while improving the system operation flexibility. MV Tail end line voltage before and after implementing this proposal is 87.9% and 96.1% respectively. The estimated annual energy savings is 1,332 MWh. About 36,730 consumers would benefit from this project.

2.3.3 Vavunathivu - Urani 33 kV

30. Construction of this express line provides a power injection at Urani to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while improving the system operation flexibility. MV Tail end line voltage before and after implementing this proposal is 90.5% and 97.6% respectively. The estimated annual energy savings is 1,618 MWh. About 35,410 consumers would benefit from this project.

2.3.4 Vavunathivu - Karadiyanaru 33 kV.

31. Construction of this express line provides a power injection at Karadiyanaru to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while improving the system operation flexibility. MV Tail end line voltage before and after implementing this proposal is 93.7% and 97.2% respectively. The estimated annual energy savings is 286 MWh. About 22,000 consumers would benefit from this project.

2.3.5 Madampe - Bowatte 33 kV.

32. Construction of this express line provides a power injection at Bowatte to improve reliability, improve line end voltages, reduce MV losses and increase line capacities, while improving the system operation flexibility. MV Tail end line voltage before and after implementing this proposal is 90.2% and 96.4% respectively. The estimated annual energy savings is 2,035 MWh. About 29,120 consumers would benefit from this project.

2.3.6 Wellampitiya to Ambathale Gantry 33 kV.

33. Load growth in the Colombo area will be met through this conductor and line replacement.

2.4 Location

34. The proposed sub-projects are located in different areas of the country including Northern, Northern Central, Central, and Eastern provinces. **Table 3** indicates details of the proposed sub-project locations and **Table 4** gives the Land ownership details for gantry based switching stations.

Table 3: Different Locations of Proposed Subprojects.

Sub-project	DS division	District	Province
Vavunathivu - Thalankuda	Manamunai West	Batticalao	Eastern
Vavunathivuv - Kaluwanchikudy	Vellaweli, Manamunai South-West	Batticalao	Eastern
Vavunathivu - Urani	Manmunai North	Batticalao	Eastern
Vavunathivu – Karadiyanaru	Manmunai West	Batticalao	Eastern
Madampe - Bowatte	Bingiriya	Puttalam/ Kurunegala	North-west
Wellampitiya to Ambathale	Kolonnawa	Colombo	Western

Table 4: Ownership Details Gantry based Switching stations.

Sub-project	Gantry Name	Area	Ownership
Vavunathivu - Talankuda	Thalankuda	176 m ²	Government land (with Divisional Secretary)
Vavunathivu - Kaluwanchikudy	Kaluwanchikudy	250 m ²	Government land
Vavunathivu - Urani	Urani	250 m ²	Government Land (with Divisional Secretary)
Vavunathivu – Karadiyanaru	Karadiyanaru	250 m ²	Government land (with Divisional Secretary)
Madampe - Bowatte	Bowatte	300 m ²	Government Land (with Divisional Secretary)
Wellampitiya to Ambatale	Ambatale	250 m ²	Government Land

35. **Figure 1** provides general location map for all projects proposed under the loan. **Figures 2-9** provides topographical maps (on 1:50,000 scale) that show the proposed distribution line routes for the following sub-projects:

Sub-project	Figure 1
Location of all projects connected to Vavunathivu GSS on topographic sheet	Figure 2
Vavunathivu GSS Photograph	Figure 3
Vavunathivu - Thalankuda	Figure 4
Vavunathivu - Kaluwanchikudy	Figure 5
Vavunathivu - Urani	Figure 6
Vavunathivu – Karadiyanaru	Figure 7
Madampe - Bowatte	Figure 8
Wellampitiya to Ambathale Gantry	Figure 9

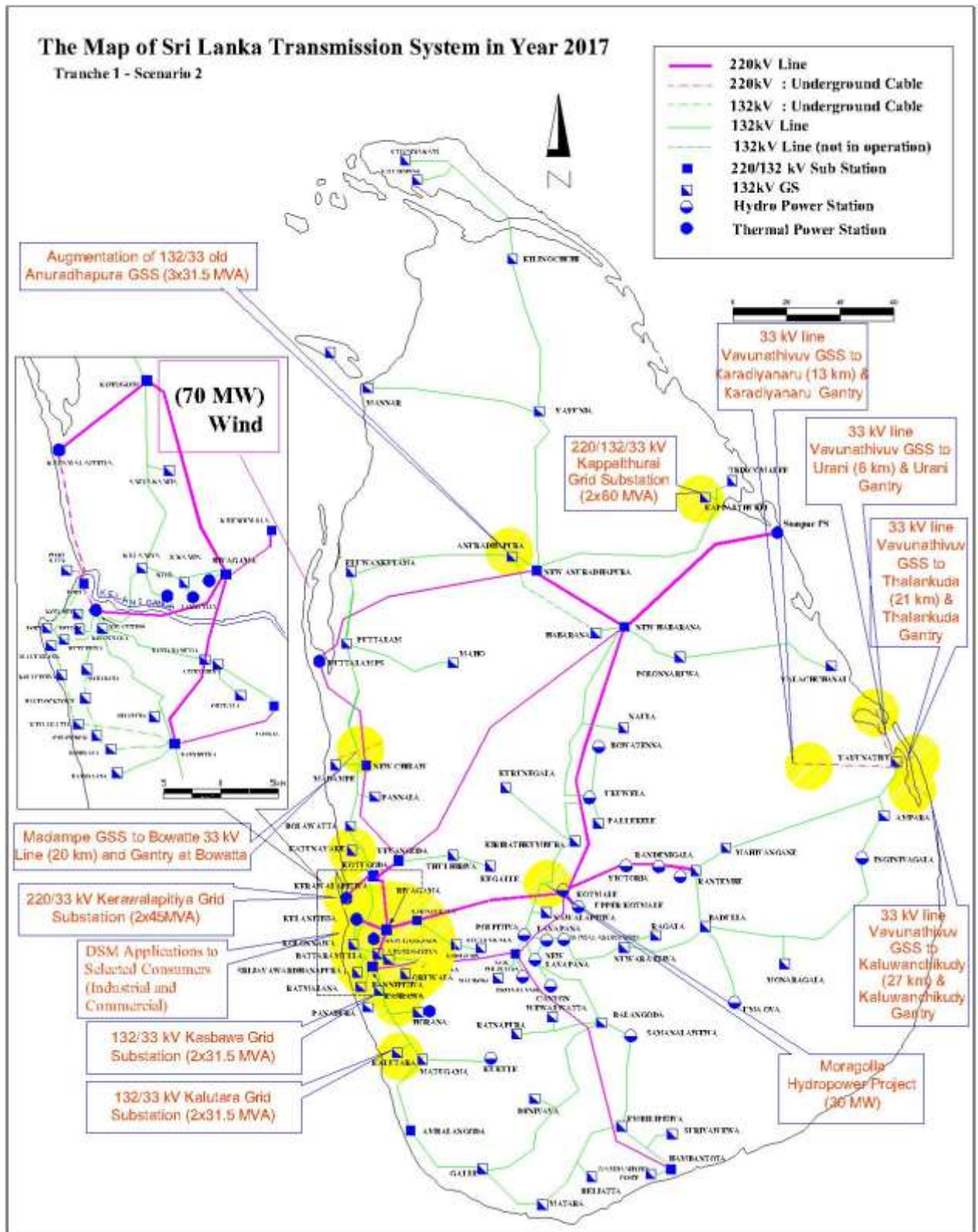
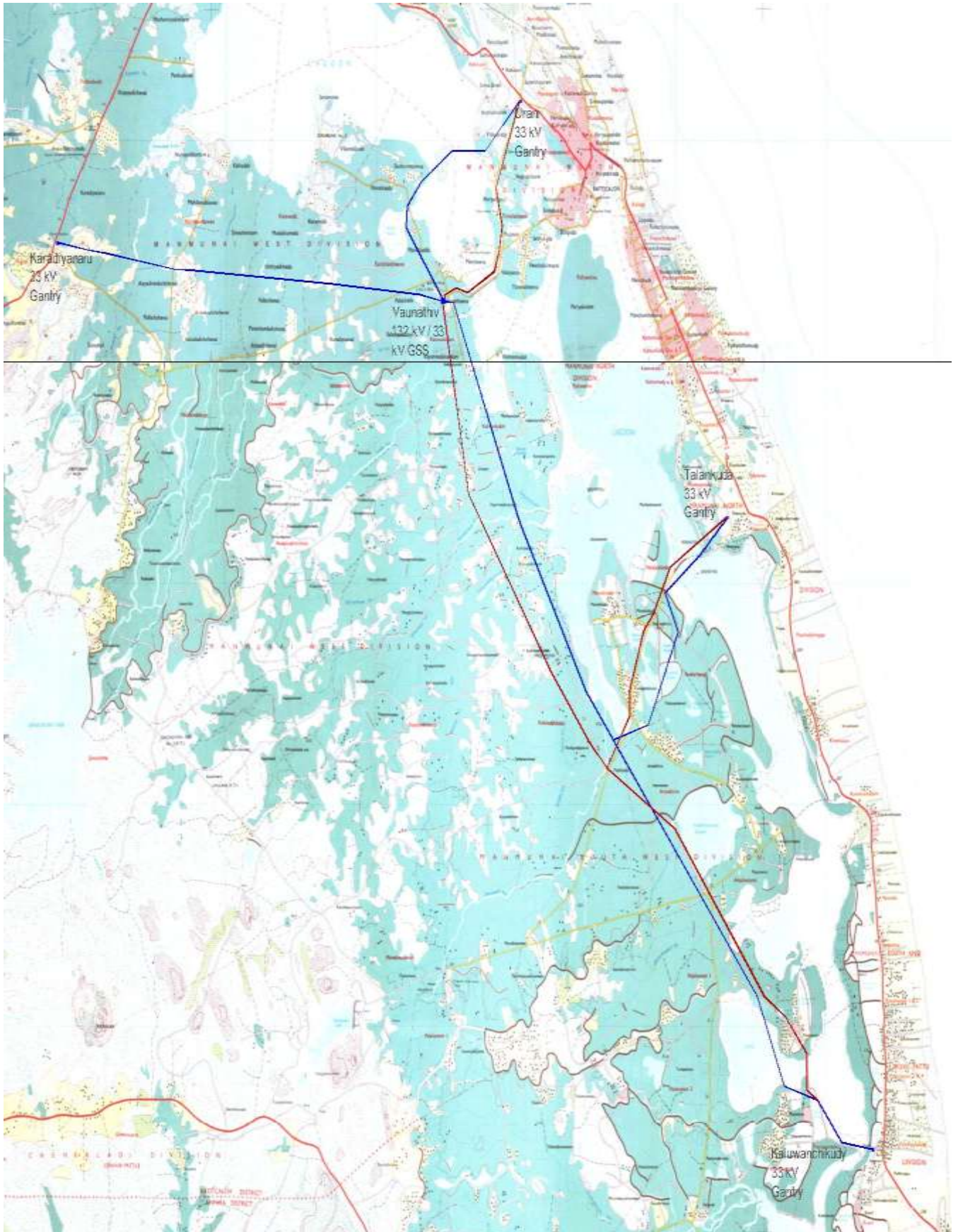


Figure 1: Map of Sri Lanka showing details of proposed Distribution projects



**Figure 2: Location of all projects connected to Vavunathivu GSS on topographic sheet
Red line (Alternative) and Blue line (Final Alternative)**



Figure 3: Vavunativu GSS Proposed (Photograph and Location on topographic sheet)



(Land identified for Thalankuda gantry)

Figure 4: Vavunathivu - Thalankuda 33 kV



(Land identified for Kaluwanchikudy Gantry)

Figure 5: Vavunathivuv - Kaluwanchikudy 33 kV



(Land identified for Urani gantry, adjacent to Batticaloa- Trincomalee road – water logging due to rainy season)

Figure 6: Vavunathivu - Urani 33 kV



(Government land identified for the gantry, Karadiyanaru (Coordinates: 0284211, 0277548))

Figure 7: Vavunathivu - Karadiyanaru 33 kV



(Proposed land for Gantry in a paddy field, Panawewa)



Figure 8: Madampe - Bowatte 33 kV (Photograph and Location on topographic sheet)



(Existing Ambatale Gantry)



Figure 9: Wellampitiya to Ambathale Gantry (Photograph and Location on topographic sheet)

2.5 Size and the Magnitude of the Operation

C.I-II. Vavunathivu - Thalankuda 33 kV.

C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km)

36. The 21 km, 33 kV distribution line from Vavunathivu GSS to Thalankuda gantry traverses 90% of the line passes through paddy fields and barren lands and the rest through home gardens, marsh lands and a lagoon near Manmunai bridge which is under construction. Temporary impacts are foreseen on loss of crops during construction and loss of some trees (121) is also anticipated. This is a distribution line and the impacts are quite limited since the right of way is minimal. It crosses the Vavunativu-Kalimadu road and Urasery- Kannankudah road between AP1 and AP2, Manaipiddy- Thalankuda road between TAP1 and AP2. It also passes through Perukkilasyar Aru (stream) between AP1-AP2, Pathanthoddathne at AP2-AP3 & Manalputty Aru at AP4-T1. The line passes through two abandoned tanks, Palam Kulam and Kunchila Kulam villages such as Kannankudah, Mandapattadi, Karayakkantive, Kottiyapulai, Illupalyadichenai, Tavelamunai, Manalpidy, Arasaditivu Padaiyandaveli, Mahiladitiv, Periyativu, Manmunai, and Thalankuda. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. The line has approximately 83 nos. lattice towers² and the conductors shall be single Lynx per phase, double circuit line.

C.II. 33 kV Thalankuda Gantry.

37. The land identified for the Thalankuda gantry comes under the Divisional Secretary which is part of the government land given to displaced families. CEB will get the land (0.03 Ha) transferred from the Divisional Secretary. The Gantry shall require an area of about 250 sq. m. It has 02 nos., incoming lines and 04 nos. outgoing lines. At the gantry, incoming lines shall be with load break switches and the outgoing lines shall be with auto-reclosures.

C.III-IV.Vavunathivuv - Kaluwanchikudy 33 kV.

C.III 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km);

38. The 27 km, 33 kV distribution line from Vavunathivu GSS to Kaluwanchikudy gantry traverses 70% through paddy fields, marshlands, and barren land. The number of trees to be cut down for ROW is 135 for the line. The line travels parallel to the Kadukkaimunai Kulam (tank) between AP 4 and AP 5 and Veeranchenai lake between AP 5 and AP 6. It cuts across Putta Kulam tank near AP7. The line passes through villages such as Kannankudah, Mandapattadi, Karayakkantive & Kottiyapulai, Illupalyadichenai, Pddippalai, ArsaditivuKadukkaimunai, Palugamam, Ipalanandapuram, Paddapuram, Munaitivu, Periyaporativu, Tavelamunai and Manalpidy. It crosses the Vavunativu-Kalimadu road, and Urasery- Kannankudah between AP1-AP2, Manalpidy junction to Manmunai bridge road between AP4 and AP5, and B 18 road between AP4 and AP5. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. Approximately the line has 113 nos. lattice towers³ and the conductors shall be single Lynx per phase double circuit line.

C.IV 33 kV Kaluwanchikudy Gantry

39. The land identified for the construction of Kaluwanchikudy Gantry is a government land behind the Kaluwanchikudy hospital. The land is an abandoned paddy land and belongs to Agriculture Department. The illegally waste dumped at the location site will be removed to a solid waste dumping site in Kaluwanchikudy area. CEB will get the land (0.03 Ha) transferred from concerned government department. The Gantry shall require an area of about 250 sq. m. It has 02 nos. incoming lines and 04 nos. outgoing lines. At the gantry, incoming lines shall be with load break switches and the outgoing lines shall be with auto-reclosures.

C.V-VI. Vavunathivu - Urani 33 kV

C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)

² Calculated on basis of @5 towers per km line).

³ Calculated on basis of @5 towers per km line).

40. The 6 km, 33 kV distribution line from Vavunathivu GSS to Urani gantry traverses 50% through paddy fields, while the rest passes through marshlands, lagoon, abandoned lands and home gardens. It crosses Batticaloa-Vavunativu road at AP5 near Urani Gantry, Vavunativu-Kardiyanaru road near Vavunativu GSS- AP1 and Vavunativu to Vilavedduvan road at AP2. The line passes through villages such as Thirupperunthurai, Eachchantheevu, Navatkaadu, Mankikaddu and Vavunativu. It crosses the Batticaloa lagoon between AP3 and AP5. This is a distribution line and the impacts are quite limited since the right of way is minimal. Temporary impacts are foreseen on loss of crops during construction and loss of some trees (133) is also anticipated. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. Approximately the line has 30 nos. lattice towers⁴) and the conductors shall be single Lynx per phase double circuit line.

C.VI. 33 kV Urani Gantry.

41. The land allocated for Urani gantry is a government land (0.03 Ha) free from any use, adjacent to the Batticaloa- Trincomalee main road (A15). The Divisional Secretary has given the consent to CEB to allocate the Government land for the construction of the Urani Gantry. The gantry shall require an area of about 250 sq. m. It has 02 nos. incoming lines and 04 nos. outgoing lines. At the gantry, incoming lines shall be with load break switches and the outgoing lines shall be with auto-reclosures.

C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.

C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km)

42. The 13 km, 33 kV distribution line from Vavunathivu GSS to Karadiyanaru gantry traverses 90% through paddy fields and the rest through barren land and home gardens. This is a distribution line and the impacts are quite limited since the right of way is minimal. Temporary impacts are foreseen on loss of crops during construction and loss of some 47 fruit trees and 138 non-fruit trees is also anticipated. It crosses the roads in seven places and high tension line in one place and passes through villages such as Vavunativu, Palakkadu, Iththiyadimadu, Ayittiyamalai, Narippulthottam and Karadiyanaru. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. Approximately the line has 47 Nos. lattice towers⁵ and the conductors shall be single Lynx per phase double circuit line.

C.VIII. 33 kV Karadiyanaru Gantry.

43. The gantry is proposed on government land (0.03 Ha, abandoned paddy land, near Karadiyanaru Farm School) free from any use. The Divisional Secretary has given the consent to CEB to allocate the Government land for the construction of the Karadiyanaru Gantry close to the A5 main road (Maha oya- Chenkaladi). Gantry shall require an area of about 250 sq. m. It has 02 nos. incoming lines and 04 nos. outgoing lines. At the gantry, incoming lines shall be with load break switches and the outgoing lines shall be with auto-reclosures.

C.IX-X. Madampe - Bowatte 33 kV.

C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km)

44. The 20 km, 33 kV distribution line from Madampe GSS to Bowatte gantry traverses through paddy fields, coconut plantations, few home gardens, marshes and water bodies (Kaduru wewa at AP 6) and it crosses the main roads: Dummalasooriya – Kokkawila road -2.25 km from Dummalasooriya junction, Dummalasooriya – Bingiriya road -3.90 km from Bingiriya junction. The line crosses the main roads and minor roads in 18 places. It also crosses the high tension (HT) lines in 13 places. Forest trees (117) and fruit trees (173) in ROW have to be removed during the construction of line. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. The most part of the ROW is in paddy fields. Panirendawa Forest Reserve is situated about 8 km north east from the GSS. Approximately the line has 76 Nos. lattice towers⁶ and the conductors shall be single Lynx per phase double circuit line.

⁴ Calculated on basis of @5 towers per km line).

⁵ Calculated on basis of @5 towers per km line).

⁶ Calculated on basis of @5 towers per km line).

C.X. 33 kV Bowatte Gantry.

45. The gantry is proposed on government land (0.03 Ha) free from any use. The Divisional Secretary has given the consent to CEB to allocate the Government land for the construction of the Bowatte Gantry. Gantry shall require an area of about 250 sq. m. It has 02 nos. incoming lines and 03 nos. outgoing lines. At the gantry, incoming lines shall be with load break switches and the outgoing lines shall be with auto-reclosures.

C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry

46. The 5.3 km, 33 kV distribution line from Wellampitiya to Ambathale gantry traverses through densely populated area along the low level road Avissawella to Colombo. The line runs parallel to the A4 highway. No wildlife sanctuary, national parks or ecologically sensitive areas are present in the nearby area of ROW. The subproject involves replacement of 76 steel poles⁷ and reconductoring the line with Lynx conductor double phase circuit line.

2.6 Implementation Plan

47. The total cost for construction of above distribution components is USD 12.03 million. The proposed overall project implementation schedule is attached in **Table 5**.

⁷ Calculated on basis of @5 poles per km line)

Table 5: Overall Project Implementation Schedule

Description	2014		2015				2016				2017				2018				2019				
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
Project Formulation																							
Loan Preparation and Signing	■	■																					
Loan Effectiveness			■																				
Implementation																							
Activity: Construction of Hydro power project																							
Tendering and Award		■	■	■	■	■																	
Preparatory works and Mobilization		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Civil works, supply and erection of Equipments																							
Testing and Commissioning																							
Activity: Construction of Transmission Lines & Grid Substations																							
Tendering and Award			■	■	■	■																	
Preparatory works and Mobilization			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Civil works, supply and erection of Equipments																							
Testing and Commissioning																							
Activity: Construction of Distribution Lines and Gantries																							
Tendering and Award		■	■	■	■	■																	
Preparatory works and Mobilization		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Civil works, supply and erection of Equipments																							
Testing and Commissioning																							
Activity: Energy Efficiency Project																							
Appointment of Project Management Consultant			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Tendering and Award			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Supply and Installation																							
Testing and Commissioning																							
Appointment of Project Supervision Consultant																							
Management Activities																							
Procurement Plan Activities			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Reviews																							
Project Completion Report																							

3.0 DESCRIPTION OF ENVIRONMENT

3.1 Batticaloa District

48. The section of proposed transmission line from Mahiyanganaya - Navagiri Nagar- Ampara and proposed land for the Vavunathive new substation is located within Batticaloa district of the Eastern province.

3.1.1 Physical Resources

3.1.1.1 Topography, Geology and Soil

49. Batticaloa district lies in the Eastern Province of Sri Lanka. It is bounded in the North by Verugul River and on the East by Bay of Bengal. The Southern and Western boundaries are along Ampara and Polonnaruwa districts (**Figure 10**). From the total area 75 per cent is flat terrain gently rising from sea level in the East to about 100m above mean sea level in the Western part of the district. There are few high striking ridges bounding the region Westward and Southward but their elevation does not exceed 300m above mean sea level. The whole district remains included within the low and intermediate peneplain. The gently rolling topography of the flat lands is interrupted by disseminated inselberg of Precambrian rocks, which have resisted the erosion agents of the predominantly gneissic basement rocks. The distinct topographical features of the district are the two lagoons, which traverse North -South covering an area of 169 km² dividing the district into two distinct areas namely, the Eastern - Sea Board and the Western Shore. The greater part of the district is constituted of Precambrian, essentially gneissic and crystalline rocks. Quaternary deposits exist mainly in the eastern boundary of the district and built up of river alluvia, sand and other littoral deposits. The main lithological types of precambrian rocks identified within the district are constituted by granitic gneisses, augen gneisses, biotite gneisses, hornblende biotite gneisses and migmatite, feldspar granite, calc-granulite or gneisses, minor marble. Foliation is the common structure in the Vijeyan series of rocks. But these are either regular or highly folded. In the South Eastern region of the district, the rock folding occurs at very close intervals giving a circular structure to the rock.



Figure 10. Batticaloa district map

3.1.1.2 Climate

50. Batticaloa district lies in a dry zone of Sri Lanka. Its climatic condition is influenced by the Northeast and South -West monsoons. The total annual mean rainfall is 1704 mm, concentrated between the months of November and January. The annual mean daily maximum and minimum temperatures are 30.6°C and 24.3°C respectively. Relative humidity ranges between 62 and 81 during the day and 76 and 83 during the night. The wind speeds vary from 9 km per hour during inter monsoons to 14.3 km per hour during North East monsoons. A high-speed wind known locally as Kachchan blows from the west during the South West monsoons.

3.1.1.3 Water Resources

51. Water resources of the district are the rivers, lagoons, and ground water. The major rivers originate from Badulla range and meander through the district, discharging into the lagoons. There are no natural springs in the district. Water in the lagoon, "Thonas" and local depressions along the coastal belt hold saline and brackish water, which is not suitable either for irrigation or domestic use. There are 15 rivers and streams in the district of which Maduru Oya is perennial on account of the recently constructed reservoirs in the upper reach. Other rivers and streams dry up by the end of May until they are replenished by the North East monsoon. Ground water is at an average depth of 2 ½ m along the coastal belt from Neelavanai to Valaichchenai and Vakarai to Verugal. The alluvial deposits of silt clay and sand in Rugam scheme extending upto Panichakerni on the Western shore of Valaicheni lagoon hold water at depths varying from 3 - 10 m. In the rest of the Western coast the aquifer is discontinuous and holds moderate to low quantity.

3.1.1.4 Air Quality and Noise

52. The land area laying the peneplain of Batticaloa range of hills and the Indian Ocean, with topography considering of lagoons, paddy field and forests, the district is blessed with a clean atmosphere. The only exception is the emission of sulphur dioxide on chlorine, from the paper factory at Valaichenai, which pollutes the surrounding villages. There are complaints made to the district environmental committee of air pollution caused by the paddy hulling and chili grinding mills in most towns in the district.

3.1.2 Ecological Resources

53. Up to the early 1950's Batticaloa district had large natural forests within its boundaries. But at present total forest cover in the district is only 20.2% of the total area of the district. Major reason for decreasing of forest cover is shifting or 'chena' cultivation, extraction of firewood and illicit felling of trees for timber etc. The district has a forest cover of 53,250 ha consisting of dense forests, open forests, mangroves and forest plantations. Dense forests accounts for less than 50 per cent of the total forest cover. Kumbuk, Mahogany, Satin, Margosa, Halmilla, Milla, Lunumidella, Timbiri and Palu are some of the specials, which grow naturally in the forests of the district. Teak, Eucaplyptus, Acacia and Etdemata are species planted in forest plantations. In spite of the extensive deforestation that has taken place elephants still roam the jungles from the district in large herds. The population of leopards, bears, spotted deer and sambar have not declined; though they are endangered by the deforestation. Jungle fowl and countless number of birds enliven the environment. Several species of reptiles including the cobra are found all over the district. There are no Wildlife Parks in the District. But natural sanctuaries are found in irrigation reservoirs, particularly, Vakaneri, Kaddumurivu, Rukam and Puluganavi tanks. Several marine coastal areas such as the coral reef, estuaries of the 15 rivers and streams, mangroves along the banks of the lagoons and the "Thonas", beaches and Sea grass are included in the district. Most of these coastal resources are declining due to human activities such as over exploitation and excessive agro chemical usage etc.

3.1.3 Economic Development

3.1.3.1 Land Use and the Agriculture

54. The total area of the district is 2,854 km². Of these 2,610 km² comprise terrestrial lands and rest 244 km² is covered by inland waters. The economic activities of the people of Batticaloa district are varied, depending on tradition, the area of domicile, inflow of capital and government

policy on development. Agriculture plays a dominant role in the economy of the district with 30.5% of the population being engaged in it. The large extents of low-lying lands on the Western shore of lagoon are ideal for paddy cultivation. Cash crops are also cultivated extensively on banks of rivers and streams. Cashew and coconut mainly grow in the Eastern shore of the lagoon regions. Keeping cattle and poultry is extending due to grazing lands and paddy fields occurring of the area. Mainly supplying of milk to collecting centres is a popular form of employment in the rural areas. But keeping poultry on a large-scale commercial scale is very rare in the district. Fishing is popular in the district. The three lagoons and the irrigation reservoirs throughout the western shore of the district attract many for inland fishing. Though the district has a long sea belt, very few people go out fishing in the sea. People living along the sea belt, are engaged in “Madal” fishing or fishing along the coast. Deep-sea fishing is yet to develop when compared to other coastal districts, very few fishermen in the district venture out for deep sea fishing. Small-scale industries available within the districts are mat weaving, pottery, carpentry, black smithy, brick kilns, lime kilns, coir industry and cane industry etc.

3.1.4 Social and Cultural Development

3.1.4.1 Population and Community

55. A total of 12 DS divisions located within the Batticaloa district of eastern province and selected land for the new substation is located within Manmunai West DS Division of the district. A total of 592,997 populations are distributed within the 12 DS divisions of the district. All ethnic group including Singhalese, Sri Lankan Tamil, Indian Tamil, Sri Lankan Moor and Burgher are distributed within the district. Of these majorities are Sri Lankan Tamil. Mainly four religious groups represented in the district are as follows: 2.7% Buddhist, 66.3 % Hindus, 23.9 % Muslims and 6.0 % Roman Catholics and 1.1% other Christians.

3.1.4.2 Health and Educational Facilities

56. A total of 28 hospitals are distributed in different locations of the district. These include a single provincial general hospital at Batticaloa, 2 base hospitals type B at Valachchanai and Kalawanchikudi, 4 district hospitals at Eravur, Kattankudy, Periya kallar and Araipattai, single peripheral unit, 3 rural hospitals, single rural hospital, single special campaign hospital, 2 central dispensaries and maternity homes and 13 central dispensaries. Altogether 309 government schools are distributed within the Batticaloa district. The literacy rate of the district is 85.9 %. The educational level of the people within the district is shown in Table 6.

Table 6: Educational Level of the People Distributed within the Batticaloa District

No Schooling	Attending Grade 1	Passed Grade 1-5	Passed Grade 6-10	Passed GCE(O/L)NCGE /SSC	Passed GCE(A/L) HNCE/HSC	Degree and Above	Not Started
9.7	1.6	29.4	35.7	13.8	6.7	0.5	2.5

3.1.4.3 Archaeology

57. Many archaeological sites dating to pre-Christian times have been found in Batticaloa district. Thus Lankavihara, Roththei (Roththa) temple, Kinnaragala, Rahathgala (Shanthamalai), Veheragalkanda (Pulukunai), eluvamulla (Pullumuilai), and Taaththon Kovil, are some sites identified and listed by the Government archaeological survey. Many towns of the area show toponymic evidence, as well as evidence from stone inscriptions, of ancient sites related to 'Seruvavila' and other Buddhist shrines of the area. Although a large number of ancient historical sites have been identified, archaeological excavations and detailed studies have been very limited. The earliest historical artefacts of the city are a Dagaba from the Ruhuna kingdom of King Kavantissa (1st century BC) as well as a Dutch fort built in the seventeenth century. In 1622, when Dutch invade the region they built a stone fortress in Puliyantivu and has many government departments and even the District Secretariat are currently located.

3.2 Colombo District

3.2.1 Physical Resources

3.2.1.1 Topography, Geology and Soil

58. Colombo is the most highly populated district in Sri Lanka. According to the census reports in 2001 the population was 2,251,274. Colombo district is divided into 13 Divisional Secretariat Divisions and their activities are coordinated and supervised by the Colombo District Secretariat. Colombo district is a combined mixture of mountains, plains and marsh lands. north and east parts of the district are mountainous whereas east and south-east parts are surrounded by marsh lands. City of Colombo is connected by a network of canals and at the heart of the city is the Beira Lake (**Figure 11**). The boundaries of the Colombo district are North-Kelani River (Gampaha district), South-Bolgoda River (Kalutara district), West-Coast line, and East-Sabaragamuwa Province.



Figure 11: Map of Colombo District

Geology

59. The geology of Colombo is representative of the geology of the western coast of Sri Lanka and has existed for much of the Quaternary era. Bore holes drilled in central Colombo City show that this area once formed an estuary of the Kelani River and the Kalu Ganga River, the two main rivers that drain into the sea on the western coast. A few kilometers upstream in the inland valleys, there is a high-level gravel formation consisting of quartz pebbles embedded in a matrix of laterite separated with pebble-free layers of laterites. The floodplains along the rivers consist mainly of alluvial deposits. The floodplains of Kelani River also provide thick alluvial profiles for unconfined aquifers, in addition to the productive overburden along tributary banks.

60. Vast area (over 90%) of Sri Lanka is underlain by metamorphic crystalline rocks of Precambrian age, which includes the Colombo area, which cover a variety of Gneisses. The geology of Colombo is representative of the geology of the western coast of Sri Lanka and has existed for much of the Quaternary era. This is shown in the 1:10,000 and 1:50,000 geological maps of Colombo region produced by the Geological Survey and Mines Bureau (GSMB). The typical rock types of this basement include Biotite gneiss, Hornblende Biotite gneiss, Charnockites, Charnockitic gneisses, Quartzite and undifferentiated Meta sediments. The floodplains along Kelani River and the Kalu Ganga rivers consist mainly of alluvial deposits. The floodplains of Kelani River also provide thick alluvial profiles for unconfined aquifers, in addition to the productive overburden along tributary banks.

61. According to Survey Department soil maps the main soil types and terrain in the project area are Red Yellow Podzolic soils with soft or hard laterite: undulating terrain, Bog and Half bog soils: flat terrain, Alluvial soils of variable texture and drainage: flat terrain and Regosols on recent beach sands: flat terrain.

3.2.1.2 Geography and climate

62. Colombo's geography is a mix of land and water. The city has many canals and, in the heart of the city, there is a 65-hectare Beira Lake. The northern and north-eastern border of the city of Colombo is formed by the Kelani River, which meets the sea in a part of the city known as the Modera (mōdara in Sinhala) which means river delta. Colombo's climate is fairly temperate all throughout the year. From March to April the temperature averages around 31⁰ Celsius. The only major change in the Colombo weather occurs during the monsoon seasons from May to August and October to January. Colombo sees little relative diurnal range of temperature, although this is more marked in the drier winter months, where minimum temperatures average 22⁰ Celsius. Rainfall in the city averages around 2,400 mm a year.

3.2.2 Economic Development

63. The majority of Sri Lankan corporations have their head offices in Colombo. Some of the industries include chemicals, textiles, glass, cement, leather goods, furniture, and jewellery. In the city centre is located South Asia's second tallest building – The World Trade Centre. The 40 story Twin Tower complex is the centre of important commercial establishments, situated in the Fort district, the city's nerve centre. Right outside the Fort area is Pettah which is derived from the Sinhalese word pita, which means out or outside as it is outside the Fort.

64. Pettah is more crowded than the fort area. Pettah's roads are always packed and pavements are full of small stalls selling products ranging from delicious sherbat to shirts. Main Street consists mostly of clothes shops and the cross roads, which are literally known as Cross Streets where each of the five streets specializes in a specific business - First Cross Street is mostly for electronic goods shops; the Second cross street is mostly for cellular phones and fancy goods. At the end of the main street further away from Fort is the Sea Street, Sri Lanka's gold market. This mile-long street is full of jewellery shops. The Colombo Metropolitan Region (CMR) encompasses the country's administrative capital Kotte and Colombo. Found within the borders of the CMR is 80% of the country's industries and over 60% of all vehicles plying Sri Lankan roads. The per capita income of the Western Province stood at USD 3,808, making it one of the most prosperous regions in South Asia.

65. Colombo district has relatively high proportion of modern facilities such as teaching, provincial, and base hospitals while in Gampaha and Kalutara Districts these facilities are very limited. For example, there are 610 hospital beds per every 100,000 population in Colombo district, compared with 260 beds in Gampaha and 210 in Kalutara. In terms of doctors per 100,000 populations, Colombo district average is 68 while the average for Gampaha and Kalutara are 17 and 22 respectively.

3.2.3 Ecological resources

66. The forest cover in Colombo district is 1,832 ha (2.7%). This forest area includes mainly the lowland rain forest formation. In addition, several wetlands are found e.g. Muthurajawela, Bellanwila-Attidiya, and Sri J'Pura Bird Sanctuary (**Table 7**).

Table 7. Name, category and extent of forests areas in Colombo district.

Name	Category	Extent (ha)
Bellanwila-Attidiya	S	60.0
Getamarawa-Dunkolahena	PR	129.7
Indikada Mukalana	PR	747.5
Kananpella	FR	263.5
Miriyagalla	FR	123.1
Sri Jayawardenapura Bird	S	449.2

Muthurajawella	S	0.0
Labugama-Kalatuwawa (Col/Kal/Rat districts)	FR	2150.1

S- Sanctuary, FR- Forest Reserve, PR- Proposed Forest Reserve

3.5.3 Biodiversity

67. As the district with highest urbanization and population density Colombo has very little natural habitats left. Still, the remaining habitats harbour a considerable faunal diversity within them. The wetland areas such as Bellanwila-Attidiya Sanctuary, Thalagama Environmental Protection Area, Jayawardenapura marshes, Bolgoda wetlands support the existence of many species of fauna that associates wetlands. According to a recent study conducted, the Bellanwila-Attidiya Sanctuary and the vicinity areas provides habitat for many animal species including 75 butterflies, 22 fish, 11 amphibians, 27 reptiles, 78 birds and 14 mammals. The mammals which has been recorded even includes threatened species such as the Fishing Cat. Many migrant birds also visit the wetlands in the Colombo district including uncommon migrants like the Glossy Ibis which is a regular visitor to both Bellanwila-Attidiya and Thalagama area. The few remaining forest patches, especially associated to the Buddhist monasteries and the sub-urban home gardens are also important in sustaining the fauna in the district. Apart from the large vertebrates Colombo district is also important in invertebrate diversity. Few nationally critically endangered dragonflies such as *Agriocnemis femina* and *Cyclogomphus gynostylus* has been recorded from the wetlands in the district and a small marsh in close to Hanwella city in Colombo district is the only known locality of the recently recorded *Archibasis oscillans hanwellanensis*. However due to the rapid on going urbanization many of the faunal species recorded from the district are under threat. The National Redlist 2012 of Sri Lanka states that 20 species of freshwater fish, 13 species of amphibians, 5 species of reptiles, 13 species of birds and 7 species of mammals recorded from the district are under the threat of extinction at the national level.

3.2.4 Social and cultural Profile

68. The Colombo Metropolitan Region, defined by the districts of Colombo, Gampaha and Kalutara, has an estimated population of 5,648,000, and covers an area of 3,694.20 km². As per the Provincial Gross Domestic Product-2010, the Western Province, which includes the cities of Colombo, Gampaha and Kalutara recorded GDP per capita of USD 3,808, the highest recorded GDP per capita for any region in South Asia. Colombo has the highest degree of infrastructure - electricity, water and transport etc. The majority of the major shopping malls in Sri Lanka are located in the city apart from that, many luxurious hotels, clubs and restaurants are situated in the city. In recent times, there's been an outpour of high rise condominiums in the city, mainly due to very high land prices.

3.2.4.1 Population

69. Colombo district's population was 2,309,809 in 2012 according to the census of population and housing. The ethnic composition is 76.6% Sinhalese, 12.2% Tamil, 9% Muslim and 3% others. The literacy rate of the population aged 10 years and over is 93.6% (male 94%, female 93.1%). The labour force participation rate, expressed as the percentage of employed aged 10 years and over, is 47.5%. Employment rate is 93.6% and unemployment rate is 6.4%. The people tend to be engaged in craft and craft related work, manufacturing and wholesale and retail trade. The total number of households in the district is 555,926, 86.8% are permanent houses, 11.2% are semi-permanent houses, 0.3% are improvised houses and 1.8% are not classified. Out of the occupied housing units, 71.6% are single houses, 9.2 % are flats, 6.4% are row houses/line rooms, and 1.5% are huts.

3.2.4.2 Sites of Cultural, Archaeological and Historical Significance

70. Colombo District was part of the pre-colonial Kingdom of Kotte. The district then came under Portuguese, Dutch and British control. In 1815 the British gained control of the entire island of Ceylon. They divided the island into three ethnic based administrative structures: Low Country Sinhalese, Kandyan Sinhalese and Tamil. Colombo District was part of the Low Country Sinhalese administration. In 1833, in accordance with the recommendations of the Colebrooke-Cameron

Commission, the ethnic based administrative structures were unified into a single administration divided into five geographic provinces. Colombo District, together with Kalutara, Puttalam, Seven Korales (present day Kurunegala District), Three Korales, Four Korales and Lower Bulatgama (present day Kegalle District) formed the new Western Province. At the time that Ceylon gained independence, Colombo was one of the two districts located in the Western Province. Parts of the district were transferred to newly created Gampaha District in September 1978.

3.3 Puttalam District

3.3.1 Physical Resources

3.3.1.1 Geography

71. Puttalam is a district situated near to the west coast of Sri Lanka. It has an area of 3,072 km². The district capital is Puttalam, which borders the Kala Oya and Modaragam Aru in the north, Anuradhapura District and Kurunegala District in the east, Ma Oya in the south, and the Indian Ocean in the west (**Figure 12**). Puttalam is well known for its picturesque lagoons, popular for shallow sea fishing and prawn farming activities. The town of Kalpitiya, and the Kalpitiya Peninsula, is located in this district. Local authorities of Puttalam Urban Council and Puttalam Pradeshiya Sabha and electorates of Puttalam and a small portion of Anamaduwa are included into the administrative area of Puttalam divisional secretariat. Puttalam D.S. has 86 villages within 22 Grama Niladari divisions. 16 out of 22 G.N. divisions are situated in Puttalam electorate and the rest located in Anamaduwa electorate.

3.3.1.2 Climate

72. Most of the district lies in the dry zone, except for the southern tip, which extends into the wet zone. Annual rainfall of the southern part of the district is in the range of 1000 mm to 1250 mm and this decreases gradually towards the north of the district. Most of the rain occurs in the Maha Season (October to January). The average daily temperature exceeds 27° C.

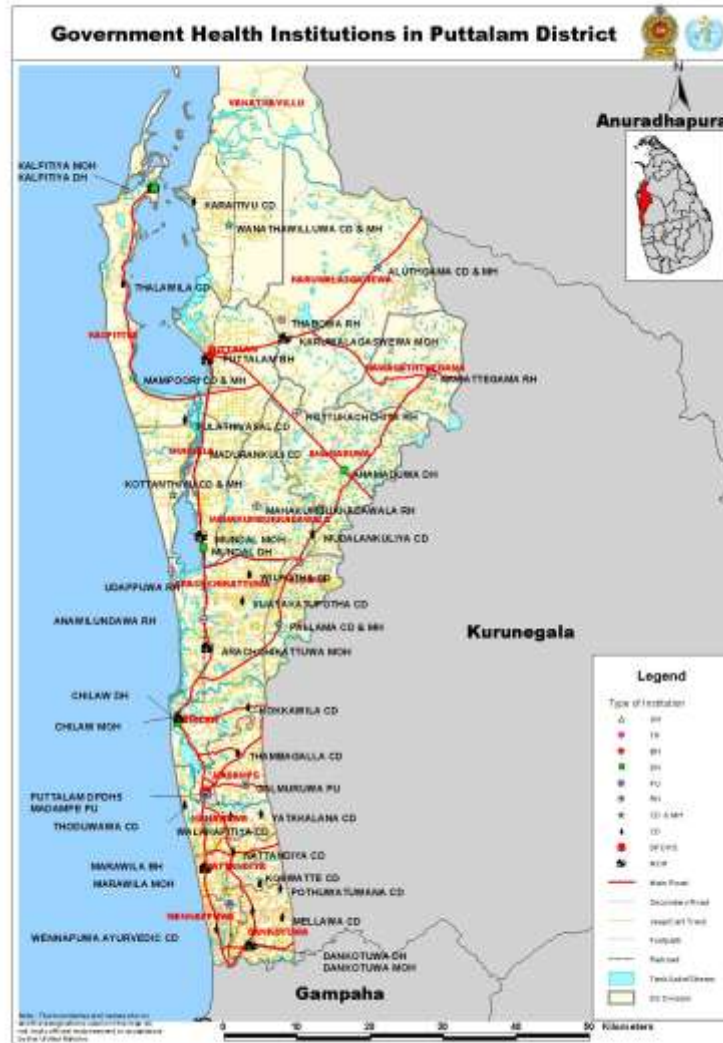


Figure 12: Puttalam district map

3.3.1.3 Topography, Geology and Soil Geology

73. The coastal belt zone of the project area north of Mondel is underlain by the unconsolidated Miocene sedimentary sequence while the rest of the district is underlain by Precambrian Western Vijayan complex. The main rock types within the district are described as follows:

Age	Formation
Recent	Residual soil, alluvium, colluviums, sand dunes, tidal flat sediments and blown sands
Quaternary	Laterite and laterite gravel, red and brown earth, partly consolidated sands and clay
Miocene	Limestone, sandstone and mudstone
Jurassic	Sandstone, shale and limestone
Precambrian	Precambrian Metamorphic rocks of the Vijayan complex

- Recent Deposits: Alluvial deposits are found on the flood plains of streams. Colloidal deposits are generally found in the lower slopes of ridges and valley terrain. Unconsolidated sands and sand dunes occur extensively along the coast with well-developed dunes rising above 10 m as found in the coastal belt from Udappu to Kalpitiya. These sand dunes are very important as they contain pockets of fresh water. Tidal flat deposits are confined to only a few locations in the lagoonal sediments such as the southern boundary of the Puttalam lagoon where the

Kalpitiya peninsular joins the mainland. The soil mantle carpeting the entire district is composed of varying soil types, each is related to the climate and the parent geological formation.

- Quaternary Deposits: A succession of sands, clays, sandy clays, gravels, and pebble deposits of marine, littoral, and continental origin exists along the coast from Maha Oya to Modargam Aru. This succession extends inland from 1 to 3 km in the south, increasing to 5 to 13 km in the north. The western coastal belt of the district, north of Mundel is covered by the Miocene Sedimentary sequence, which extends 10 km inland and wedges over the crystalline basement rocks. The underlying Precambrian granitic rocks and the overlying quaternary sands and clays are both unconfined within the Miocene succession.
- Jurassic Sedimentary Deposits: Isolated and very small sedimentary basins have been recognized within the metamorphic terrain at Pallama, Andigama, and Tabbowa areas. These sedimentary basins of Jurassic age are not exposed and have been identified only in drill cuttings and drill cores. In the Tabbowa area, a sequence of loosely consolidated arkosic sandstones, grits, and shale with occasional limestone lenses has been identified. The sand stone is distinctly reddish and medium grained in texture.
- Precambrian Metamorphic: Rocks of the Vijayan series occupy the eastern portion covering over seventy percent of the district. These rocks are overlain by a weathered mantle beneath a thin surface soil layer. The main rock types in the Precambrian complex are granites, granite gneisses, migmatites and migmatitic gneisses and hornblende biotite gneisses with quartzites, calc gneisses, amphibolites, pegmatites, and charnockites as minor rock types. The crystalline basement rocks of the western Vijayan series in the Puttalam District appear to have been deformed more than once, as indicated by the structural features in the exposed rock faces of many rock quarries. The Precambrian basement is directly overlain by the Miocene formation in the west and thus the contact is an unconfined.

Soil

74. Two kinds of soils are found in the district. The southern part contains brown colored gravel based soil while the northern part contains latasol soil. Latasol is known as the oldest soil of its kind. It was developed in an entirely different climate situation than present days. It permits easy seepage of water. It is not very nutritious except for the cultivation of Citrus family, cashew and Ipil plantation.

Geomorphology

75. Aerial photos and relief maps reveal that three distinct geomorphic zones can be identified in the Puttalam District. Zone 1 is a flat coastal strip: A narrow belt forms the western boundary, having a width of 1 to 2 km in the south and widening to 8 to 12 km in the north. The elevation of the belt starts at sea level and rises to an elevation of about 20 m as one moves inland. However, close to the sea at Aruwakalu an uplifted Sri Lanka - Upgrading and Modernization of the Hydro-Meteorological Information System limestone block rising to about 6 m and parallel to the coast breaks the monotonous flatness of the belt and extends as a ridge to Kudramalai. A series of very low and rounded ridges and runnels running parallel to the coastline are also visible in a few locations. Zone 2 is undulating low ridges: An area of broadly undulating and widely set low ridges bounded by Mahaoya in the south, Maha Kumbukkadawels in the north, and Pallama in the east. These broad ridges are generally aligned in a north-south direction and are structurally disturbed by a transversal fracture system, which has developed into fracture valleys having a general east-west alignment. Zone 3 is monadknocks and rock knobs: The eastern most area of the district comprising of monadknocks and turtle backed rock outcrops of high relief rises from 20 m to 110 m msl.

3.3.1.4 Drainage

76. In the coastal strip north of Puttalam, a few man-made lakes and a number of natural lakes (villus) and marshes are found. Due to the very low relief (flatness) of the area, the area drains very slow through meandering streams, villus, and marshes before entering the sea. Major streams such as the Maha Oya and Deduru Oya, which flow east to west, are located in the southern part

of the district. These two streams together with their tributaries drain the area to the west. Kala Oya and Mee Oya are the major streams to the north, which originate in the dry zone and have very low flows. Depressions around the Pallama area support the formation of swamps as a result of floodwaters. The mature topography and the meandering river courses have given rise to ox-bow lakes along the Deduru Oya. The lower flood plains encompassing the subdued coastal stretch are subjected to frequent flooding, especially from torrential monsoonal rains. The rural population depends on groundwater with the exception of the few perennial streams and major irrigation reservoirs in the area; all other surface water sources dry up.

3.3.1.5 Biodiversity

77. Puttalam district is located in the dry and semi-arid zones of the country. It consists of around 15% of natural dry-mixed evergreen forest as of 1998 (IUCNSL and MOENR, 2007) and diverse coastal habitats. Thus, it is home to some specific fauna as well as species common throughout the dry zone of Sri Lanka. Puttalam district is a district with a considerably rich avifauna with wetland areas to where lots of migrant birds visit every year. The Annawilundawa tank sanctuary which is located within the district has been even declared as a wetland with international importance due to this reason. Chilaw coastal areas, Navadankulama tank, Puttalam salterns and Kalpitiya area are some of very popular birding localities in the district. As Puttalam district is the southernmost area in the north western semi-arid zone of the country some of the bird species which are mainly found in the Indian avifauna zone of Sri Lanka (Kotagama and Ratnavira, 2010) can also be found in Puttalam district. Some of them are Eurasian Collared Dove (*Streptopelia decaocto*), Black Drongo (*Dicrurus macrocercus*) and Grey Francolin (*Francolinus pondicerianus*). Apart from birds Puttalam is also a home to many other vertebrate species as well as invertebrates. National Redlist 2012 of Sri Lanka has stated that 27 threatened vertebrate species including 7 endemics has been recorded from the Puttalam district.

3.3.2 Social and Cultural Development

3.3.2.1 Population and Community

78. The population of the Puttalam district by 2012 amounted to 760,778. The population density of Puttalam district is 250/km². The male population representing 48.48% amounts to 368,860 persons. The female population accounts for 390,916. On a community basis, Sinhalese accounts for 559,031 persons. This is 73.48% of the total population of the district. Muslims accounts for 146,820 persons and Tamils accounts for 50,026 persons. In categorizing the population on the basis of religions, 328,450 persons are Buddhists, 152,280 belong to Islam and Hindus and Christians account for 28,812 and 249,006 respectively.

Internally Displaced Persons:

79. The D.S. division of Puttalam and three other neighbouring D.S. divisions within the Puttalam electorate and partly Anamaduwa electorate provided refuge to the evicted Muslims from Northern Province around October 1990. The settling of these people in the said D.S. divisions created umpteen problems to the people referred to as host community in the area. Competitions and sharing the resources available, water, land and problems in the economic activities of the Host community propped up. Even after the end of the war, the vast majority of the IDPs have opted to stay in Puttalam, which create more problems to the Host community.

3.3.2.2 Economy

80. Puttalam is a business center catering to other D.S. divisions as well. Through the production of solar salt approximately 10,000 persons are employed in salt related activities. The coastal population is involved in fishing in the lagoon. Although the division is not considered as a major agricultural area coconut plantation in the South, cashew and paddy are cultivated in Northern part of the division.

81. There are no major industries specific to Puttalam. Some home based products from coconut kernel are active within the division. Micro and small level industries are found in the division. Especially a soft drink producing plant, garment factories and snack (mixture) production

are well known small industries. Meanwhile as for large level industries are cement, salt and gravel brick/ tile factories exist.

3.3.2.3 Health and Educational Facilities

Education (formal and informal)

82. **Formal educational institutions:** From pre-schools to Maha Vidyalaya (secondary colleges) including two National schools are functioning in this D.S. division. Among these formal educational institutions, 'President's Science College' which is the first in Sri Lanka also situated in this division.

83. **Informal (tertiary):** A study center of Open University of Sri Lanka and the vocational training institute which provides tertiary education with many private owned academic institutions provide somewhat educational facilities to the people in this division.

3.3.2.4 Sites of Cultural, Archaeological and Historical Significance

84. The district secretary's administrative office which is known as 'kachcheri' was constructed during the period of Dutch administration of the maritime province. This two story building with timber and the rafters and beams were without joints is being used even today.

85. Presentation of a trumpet and two Royal insignias of the Kandyan king Sri Veera Parakrama Narendrasinhe to the Mohideen Jumma (Grand Mosque) Masjid of Puttalam when he visited in 1720 A.D. and was very warmly received by the people of Puttalam.

- St. Clement Catholic Church situated in Puttalam – Colombo main road.
- A Catholic burial ground situated in front of the urban council administrative building.
- The house belongs to E.S.M. Cassim Marikkar family in the North road.

86. Although most of the historic monuments of Puttalam have eroded in the passage of time the simple way of life of the people of Puttalam, their hospitality, tolerance and compromise with all the communities living in this area announces the potential development of this area as a most desirable destination for people within the country and outside.

4.0 SCREENING OF POTENTIAL ENVIRONMENTAL IMPACT AND MITIGATION MEASURES

4.1 CEB'S Approach for Route Selection

87. At the planning stage itself, one of the factors that govern the establishment of the distribution line is the infringement of populated/forest/cultivated area and scarce land. Wherever such infringements are substantial, different alternative options are to be considered. During route alignment, all possible efforts are made to avoid the populated/forest/cultivated area infringement completely or to keep it to the barest minimum. Whenever it becomes unavoidable due to the geographical locations/terrain, mitigation costs involved towards avoidance needs to be worked out. While identifying the distribution system for a generation project or as a part of distribution grid, preliminary route selection is done by CEB based on the interpretation and walk over surveys according to the 1:50,000 maps/topographical maps of the area.

88. For selection of optimum route, the following points are taken into consideration:
- i. The route of the proposed express lines does not involve any human habitation.
 - ii. Any monument of cultural or historical importance is not affected by the route of the distribution line.
 - iii. The proposed route of distribution line does not create any threat to the survival of any community with special reference to tribal community.
 - iv. The proposed route of distribution line does not affect any public utility services like playgrounds, schools, other establishments etc.
 - v. The line route does not pass through any sanctuaries, protected park etc.
 - vi. The line route does not infringe with area of natural resources.

4.2 Alternatives for Line Alignment

89. The subproject will put up new gantry based switching station on feeders and auxiliary 33/0.4 kV transformer. The work will be carried out by setting up gantry based structures on poles and seek 20 m right-of-way (RoW) clearances for 33 kV express distribution lines. The CEB norms for setback and other parameters are given in **Annexure 1**.

90. For selection of optimum route, the following points are taken into consideration:
- i. As a principle, distribution alignments generally pass through major towns but whenever possible, to account for future urban expansion, the minimum RoW distance (total 20 m for 33 kV lines as per CEB norms) shall be kept 10 m away from any houses or structures .
 - ii. Construction activities do not adversely affect the population living near the proposed lines and does not create any threat to the survival of any community with special reference to tribal community or any public utility services like playgrounds, schools, other establishments etc.
 - iii. Similarly, plantations/forests are avoided to the maximum extent possible. When it is not possible, a route is selected in consultation with the Divisional Secretaries that causes minimum damage to existing plantation/forest resources.
 - iv. The MV/LV line route does not infringe with area of natural resources. Alignments are selected to avoid wetlands and unstable areas for both financial and environmental reasons.
 - v. The route of the MV/LV line does not affect any monument of cultural or historical importance.
 - vi. Ensure that Polychlorinated Biphenyls (PCBs) are not used in the transformers installed in the project funded facilities.
 - vii. In addition, care is also taken to avoid/minimise protected parks/national parks, bird sanctuaries and any other forest area rich in wild life. Proper care shall be taken to avoid areas of high density of trees if the line passes through any forest reserve and appropriate approvals of Department of Forests and Department of Wildlife, Sri Lanka.

91. In order to achieve this, CEB has undertaken route selection for individual gantry based switching stations/33 kV lines in close consultation with representatives from Divisional Secretaries, Ministry of Land, Agrarian service Department, Department of Survey, Forest Department, and the local community. Although under the national law, CEB has the Right of Way (RoW), yet it considers alternative alignments during site selection, with minor alterations often added to avoid environmentally sensitive areas and settlements at the implementation stage.

92. Keeping above in mind, various alignments of lines were considered taking care of above factors. All such different alternatives were studied by the CEB officials before being proposed to ADB for funding to arrive at most optimum route which can be taken up for detailed survey and assessment of environmental and social impacts for their proper management. **Annexure 2** gives the location analysis for the gantry, **Annexure 3** gives an illustrative evaluation analysis of the alignments of 33 kV line. **Annexure 4** gives the inventorization along the proposed 33 kV lines. **Table 8** gives the summary of the final evaluation of the site selection.

Table 8: Summary of final alternative taken for Project Consideration

SNo	Project Component	Alternative Chosen	Reason
C.I-II.	Vavunathivu - Thalankuda 33 kV.		
C.I.	33 kV distribution line Vavunathivu GSS to Thalankuda (21 km)	Alternative which traverses through paddy fields.	Avoids residential areas, home gardens
C.II.	Thalankuda Gantry		
C.III-IV.	Vavunathivu - Kaluwanchikudy 33 kV.		
C.III.	33 kV distribution line Vavunathivu GSS to Kaluwanchikudy (27 km)	Alternative which traverses through paddy fields.	Avoids residential areas, home gardens
C.IV.	33 kV Kaluwanchikudy Gantry	Gantry behind the hospital, abandoned land, used to dump solid waste- to be removed to waste dumping site	Avoids the Kaluwanchikudy town.
C.V-VI.	Vavunathivu - Urani 33 kV		
C.V.	33 kV distribution line Vavunathivu GSS to Urani (6 km)	Alternative avoid Air Force land and Mantheevu island (Urani- Mankikattu- Karavetti-Eachanthivu- Vavunathivu)	No impacts on Air Force land and Mantheevu island
C.VI	C.VI. 33 kV Urani Gantry	Abandoned land next to Batticaloa-Trincomalee road at Urani.	
C.VII-VIII.	C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.		
C.VII.	33 kV distribution line Vavunathivu GSS to Karadiyanaru (13 km)	Alternative which traverses through paddy fields.	Avoids residential areas, home gardens
C.VIII.	33 kV Karadiyanaru Gantry	Abandoned land near the Police station, next to A5 road	No building in RoW or private land used.
C.IX-X.	C.IX-X. Madampe - Bowatte 33 kV.		
C.IX.	33 kV distribution line Madampe GSS to Bowatte (20 km)	Alternative which passes mainly through paddy fields	Avoid highly residential areas, home gardens, coconut plantations
C.X.	33 kV Bowatte Gantry	Stream reservation, no houses	Avoids residential areas, home gardens
C.XI	Wellampitiya to Ambathale Gantry		
C.XI	33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry	Same alignment	

4.2.1 Reasons for the final selection

93. Considering the various reasons based on information in the **Annexures 2, 3, and 4**, the alignments selected were found to be most suitable as they involved lesser populated area, plantation/forest areas, and minimum RoW problems. In addition, a minimum disturbance to the reserve forests has been caused as the route of the line shall be utilised which has more degraded forests.

4.3 Environment Impacts and Mitigation Measures

94. The potential environmental impacts associated with the subprojects occur during the pre-construction, construction, and operation phases, which will typically involve:

- Removal of vegetation, including trees and crops for access roads.
- Excavation of sites for project facilities (if at all), including transport and disposal of excavated materials, erosion at construction sites, possible noise/dust pollution, and management of workers and waste.
- Trenching activities breaking underground cables.

- Impacts of Polychlorinated Biphenyls (PCB)⁸ during transformer replacement process, and improper disposal of transformer containing PCB, if required.
- Spills of fuel and other lubricants at the construction site/workshop/repair site that may affect soils and water quality.
- Noise from construction equipment.
- Preservation of cultural sites and artefacts.

4.3.1 Environmental Impacts and Mitigation Measures Needed during the Design/Pre-Construction Phase

4.3.1.1 Route Selection

95. As per the Forest Conservation Act, all the power lines infringing upon the ecologically sensitive areas⁹ have to be approved by the CEA. Approval from CEA will be obtained well in advance for all the subprojects that infringed on forestlands. Forests are avoided as far as possible while selecting the distribution line route. Where it is not possible to avoid forests, the routing of the lines in the forest area will be done in consultation with respective forest authorities to minimise damage to the forests and to ensure minimal impact on wildlife.

96. The natural terrestrial environment of the proposed project areas in Batticolao, Colombo and Puttlam has already been significantly altered and disturbed by mankind for conversion into paddy fields, tea, rubber and other mixed cultivations, villages, semi-urban areas with infrastructure facilities such as roads, drains, homes and buildings etc. under various development projects. Therefore, besides cutting of plantation trees, tea and home gardens, the subproject should not cause any significant impacts to the existing environment nor affect any environmentally significant areas.

97. The overhead conductor must not affect any of the sewerage/drainage system, as well as no streams should be disturbed. Apart from limited disturbance during construction, there should be no long-term effects on water quality.

98. Care must be taken that line routes must avoid wetlands and unstable areas especially in Ampara district as the line is near the coastal area. The routing of the lines is selected to avoid relocation of people and threats to common property resources. Engineering and biological measures must be taken to prevent soil erosion, impact on agricultural land en-route the line must only be restricted to the construction phase, and adequate compensation as determined by the district authorities must be paid to the affected persons.

99. The transformers and other equipment used in the project must be free from polychlorinated biphenyl (PCB). Production of PCBs has now been banned in most countries and it will be phased-out in 2025, therefore equipment (transformers), if procured under the loan should not contain PCBs. Procurement of new transformers will specify that PCB should not be used and only non-PCB coolant such as hydrocarbon mineral oil will be used. At any stage, during transformer replacement process, if presence of PCB in the existing transformers is confirmed, the Engineering, Procurement, and Construction (EPC) contractor will adopt best industry practices with regard to handling of hazardous materials, implement it within its already existing work and safety handling procedures, and will recommend the appropriate disposal of these equipment in accordance with the applicable National and International standards.

100. Batteries and transformer oil must be disposed of through lead waste re-processors in accordance with the provisions of CEA and compliance with these provisions must be reported to ADB/CEA through biannual reports.

⁸ Polychlorinated Biphenyls (PCB) are mixtures of man-made chemicals and due to their non-flammability, chemical stability and high boiling point have been used extensively as insulators. PCB's are highly stable, toxic and persistent chemicals. Their manufacture, processing and use has now been banned in many countries. (USEPA web page on PCBs).

⁹ Environmentally Sensitive Area (ESA) is a type of designation for an area which needs special protection because of its landscape, wildlife or historical value.

101. No land acquisition nor resettlement requirements will be required for tower line. Acquisition of land will not be required from the surrounding communities for an approximate 250-300 sq.m. plot of land required for gantry based switching stations for Gantries land as all are based on government land.

102. Total land requirement for Tranche 1 subprojects is given in **Table 9** below:

Table 9: Total land required for Tranche 1 subprojects

		Total Land Area in Ha	Private Land in Ha	Government/Forest land in Ha
C.I-II. Vavunathivu - Thalankuda 33 kV.				
1	C.I. 33 kV distribution line Vavunathivu GSS to Thalankuda (21 km)	16.5	13.0	3.5
2	C.II. 33 kV Thalankuda Gantry	0.017		0.017
C.III-IV. Vavunathivu - Kaluwanchikudy 33 kV.				
1	C.III 33 kV distribution line Vavunathivu GSS to Kaluwanchikudy (27 km)	24.3	18.3	6.0
2	C.IV 33 kV Kaluwanchikudy Gantry	0.025		0.025
C.V-VI. Vavunathivu - Urani 33 kV				
1	C.V. 33 kV distribution line Vavunathivu GSS to Urani (6 km)	6.9	4.25	2.65
2	C.VI. 33 kV Urani Gantry	0.025		0.025
C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.				
1	C.VII. 33 kV distribution line Vavunathivu GSS to Karadiyanaru (13 km)	12.4	11.2	1.2
2	C.VIII. 33 kV Karadiyanaru Gantry	0.025		0.025
C.IX-X. Madampe - Bowatte 33 kV.				
1	C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);	19.25	18.30	0.95
2	C.X. 33 kV Bowatte Gantry	0	0	0
C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry				
	None	None	None	None

103. No major sites of archaeological, cultural, or historic significance are present along the proposed alignment of the distribution lines and gantries.

4.3.2 Environmental Impacts and Mitigation Measures Needed during Construction

104. Environmental impacts identified during construction are limited in size and are temporary. The scale of the works is relatively minor and the project areas proximity to the work force means that no construction camps are required.

105. Fuel and other lubricants will need to be stored at the construction sites. Best industry practice will be required to ensure that accidental spills and discharge to the soil and aquatic environments are prevented. Any fuel (including drums and tanks, if any) should be placed at least 20 m away from waterways and no equipment is to be refuelled within this distance.

106. Only trained personnel should undertake handling of fuel and lubricants. In addition, machinery should be properly maintained and waste oil and oil filters must be disposed of to meet best industry practice. This will be the contractor's responsibility.

107. At the completion of work, the contractor will be required to rehabilitate and clean up all work sites. This includes repairing damage to pavements, roads, and drainage systems. All waste is to be removed from the sites. The contractor and the CEB will be responsible for implementing this requirement.

Removal of Trees

108. The project may require some fruit/non-fruit trees to be removed during the construction activities. **Table 10** gives the list of trees to be felled for Tranche 1 subprojects. Approximately 479 forest trees and 278 fruit/nonfruit/plantation trees will be removed from the RoW¹⁰ of the distribution lines. These would include shading timber, plantation species as well as edible fruit

¹⁰ The ROW is 10 m for the distribution line. Few scattered trees are found in the area but not necessary to cut down for the distribution line.

species. The initial construction works along the alignment involving land clearance, cutting, filling, and levelling may cause loss of vegetation. This will be irreversible impact. Care has been taken to avoid the thick plantations/vegetation as far as possible and tower locations are selected at plain paddy fields where the vegetation is thin. This will minimise the tree loss.

109. In Sri Lanka normally, for compensatory reforestation or afforestation program if the line goes through a forest area where trees have to be cut, the Forest Department make an inventory of trees to be cut and the area devoid of trees. CEB is then required to fund the reforestation program in the nearby area (or they might already have reforestation program prepared for the district) which is roughly \$ 2000 per ha.

110. Compensation is being paid to the tree owners in the private areas as per GoSL norms. In home gardens, if trees have to be removed the CEB pays compensation to the owner. For example, if a coconut tree has to be cut and it produces a good yield then the maximum SLR 55,000 (\$ 425) is paid to the owner. This amount was calculated by Coconut Development Board. If a coconut seedling is uprooted for the line the compensation is SLR. 1000 only. For timber trees e.g. Jak, Mahogany, Sapu, Lunumidella, Mango, the amount to be paid is decided by the Divisional Secretary or Grama Niladhari. The amount varies according to the tree species, height and diameter, quality of the tree etc. based on the market value of the tree.

Table 10: Total Number of Trees to be felled for Tranche 1 subprojects

No	Sub-Project Details	Private Land		Forest Land
		Total number of fruit trees to be felled	Total number of Non fruit trees to be felled	Total number of forest trees to be felled
C.I-II. Vavunathivu - Thalankuda 33 kV.				
1	C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km)	11	03	110
2	C.II. 33 kV Thalankuda Gantry	0	0	0
C.III-IV. Vavunathivu - Kaluwanchikudy 33 kV.				
1	C.III 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	18	04	125
2	C.IV 33 kV Kaluwanchikudy Gantry	0	0	0
C.V-VI. Vavunathivu - Urani 33 kV				
1	C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)	0	0	0
2	C.VI. 33 kV Urani Gantry	0	0	0
C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.				
1	C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km)	30	17	131
2	C.VIII. 33 kV Karadiyanaru Gantry	0	0	0
C.IX-X. Madampe - Bowatte 33 kV.				
1	C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);	173	22	113
2	C.X. 33 kV Bowatte Gantry	0	0	0
C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry				
	Existing Alignment	0	0	0

111. No declared wildlife sanctuary and national parks are located near the project affected. No secondary information available on local water bodies due to 30 year conflict in this area, no data was collected on ecological resources. These line routes have been demarcated avoiding all populated areas, and any possible ecological areas. However, noise, vibration, and emission from construction vehicles, equipment will occur during construction and pre-construction stages in temporary manner. **Table 11** gives the details.

Table 11: Distance from WLS and National Parks for all Tranche 1 subprojects

	Sub-project	Nearest Aerial Distance	Protected Area	IUCN Category
C.I-II. Vavunathivu - Thalankuda 33 kV.				
1	C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km)	55 km	Maduru oya National Park	II
	C.II. 33 kV Thalankuda Gantry	60 km	Maduru oya National Park	II
C.III-IV. Vavunathivu - Kaluwanchikudy 33 kV.				
1	C.III 33 kV distribution line Vavunathivuv GSS to	48 km	Maduru oya National Park	II

	Sub-project	Nearest Aerial Distance	Protected Area	IUCN Category
	Kaluwanchikudy (27 km)			
2	C.IV 33 kV Kaluwanchikudy Gantry	52 km	Gal oya National Park	II
C.V-VI. Vavunathivu - Urani 33 kV				
1	C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)	50 km	Maduru oya National Park	II
	C.VI. 33 kV Urani Gantry	55 km	Maduru oya National Park	II
C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.				
1	C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km)	40 km	Maduru oya National Park	II
	C.VIII. 33 kV Karadiyanaru Gantry	36 km	Maduru oya National Park	II
C.IX-X. Madampe - Bowatte 33 kV.				
2	C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km)	23 km	Anawilundawa Sanctuary	Less than VI
3	C.X. 33 kV Bowatte Gantry	21 km	Anawilundawa Sanctuary	Less than VI
C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry				
		30 km	Muthurajawela Sanctuary	Less than VI

Distance from Sensitive Receptors

112. Distance from various receptors is give in **Table 12** below:

Table 12: Approximate distance of Tranche-1 subprojects from sensitive receptors

SNo.	Name of Subproject	Primary School	Secondary School	Temple	Primary Clinic (PHC)	Main Hospital	Population/Inhabitant (in pockets)	Metal access path to the Site
C.I-II. Vavunathivu - Thalankuda 33 kV.								
1	C.I. 33 kV distribution line Vavunathivuv GSS to Thalankuda (21 km)	0.65km to School at Kannankudah, 0.75km to School at Illupalyadichena i, 0.80 km to School at Mahiladitivu	0.75 km to School at Talancuda & 1.65 km to School at Kokkaddicholai	0.3 km to Kovil Manmunai, 0.8km to Kovil at Mahiladitivu, 0.4 km to Kovil at Kottiyapulai, 0.05 km to Kovil at Kokkaddicholai & 0.65 km to Kovil at Kannankudah,	3 km to Primary Clinic at Kattankudy, 0.75 km to Dispensary at Mahiladitivu,	10.5 km to Batticaloa Base Hospital	550 (17 houses in 30 m)	A15 & Talancuda - Manmuani road, Paddippalai Mahiladitivu road , vavunathivuv Kadukkaimunai road
	C.II. 33 kV Thalankuda Gantry	0.65 km to School at Kannankudah,	0.75 km to School at Talancuda	0.3 km to Kovil Manmunai,	3 km to Primary Clinic at Kattankudy,	10.50 km to Batticaloa Base Hospital	150 (12 houses in 100 m)	A15 & Talancuda - Manmuani road
C.III-IV. Vavunathivu - Kaluwanchikudy 33 kV.								
1	C.III 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	0.65 km to School at Kannankudah, 0.75 km to School at Illupalyadichena 0.25 km to School at Kadukkaimunai, 1.25 km to School at Katchenai & 1.25 km to School at Periyaporativu	1.00km to School at Palugamam,	0.40 km to Kovil at Kottiyapulai, & 0.65 km to Kovil at Kannankudah, 0.35 km to School at Periyaporativu	3 km to Primary Clinic at Kattankudy, 0.75 km to dispensary at Palugamam, & 0.35km to Kovil at Periyaporativu	10.50km to Batticaloa Base Hospital & .05km to Kaluwanchikudy main hospital	1200 (24 houses in 30 m)	A15, B344, B18, Periyaporativu - Palugamam road , Talancuda - Manmuani road, Paddippalai Mahiladitivu road , vavunathivuv Kadukkaimunai road
2	C.IV 33 kV Kaluwanchikudy Gantry	3.25 km to School at Periyaporativu	0.25 km to School at Kaluwanchikudy	0.50 km to Kovil Kaluwanchikudy		0.05km to Kaluwanchikudy main hospital	230 (7 houses in 100 m)	B344
C.V-VI. Vavunathivu - Urani 33 kV								
1	C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)	0.5 km to School at iruthayapuram, 0.5 km to School at Eachchantheev	1.2 km to School at Vettukadu, 0.3 km to School at Mankikaddu & 0.20 km to	0.5 km to Kovil nearby urani gantry, 0.05 km to Kovil at Pillayarady , 0.15 km Kovil at	1 km to despesary at Navatkaadu	4 km to Batticaloa Base Hospital from Urani and Vavunathive	75 (4 houses in 30 m)	A15, Batticaloa-Vavunathivuv road, Vavunathivuv-Karadiyanaru

SNo.	Name of Subproject	Primary School	Secondary School	Temple	Primary Clinic (PHC)	Main Hospital	Population/ Inhabitant (in pockets)	Metal access path to the Site
		u,	School at Vavunativu	Eachchantheevu, 0.40 km to Kovil at Mankikaddu & 0.15 km Kovil at Vavunativu		GSS		road & Vavunathivuv-Vilavedduvan road
	C.VI. 33 kV Urani Gantry	0.50 km to School at iruthayapuram	1.20 km to School at Vettukadu	0.5 km to Kovil nearby urani gantry		4 km to Batticaloa Base Hospital	350 (no houses in 30 m)	A15
C.VII-VIII.	Vavunathivu - Karadiyanaru 33 kV.							
1	C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km)	0.80 km to School at Ayittiyamalai	1.50 km to School at Vavunathive & .50 km to School at Karadiyanaru	1.20 km to Kovil at Vavunathivuv & .50 km to Kovil at Karadiyanaru	2.4 km to Mahailavadduwan	4.00km to Batticaloa Base Hospital & 17.00km to Batticaloa Base Hospital	125 (6 houses in 30 m)	Batticaloa-Vavunathivuv road, A5, Vavunathivuv-Karadiyanaru road & Karadiyanaru –Kaikudah road
	C.VIII. 33 kV Karadiyanaru Gantry	3.70 km to School at Pallachchenai	0.70 km to School at Karadiyanaru	0.50 km to Kovil at Karadiyanaru	11.5 km to Primary Clinic at Chenkalady	17.00km to Batticaloa Base Hospital	140 (4 houses in 30 m)	A5
C.IX-X.	Madampe - Bowatte 33 kV.							
2	C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);	0.20 km to School at Suduwella, 1.20 km to School at Nankadawara, 0.40 km to School at Watuwatta, 0.50 km to School at Hiruwalpola	0.35 km to School at Galmuruwa, 0.60 km to Kaduruwewa & 0.05 km to School at Panawewa		0.60 km to Balawatta Dispensary & 0.80 km to Mawikkotuwa Central dispensary	2.50km to Bingiriya hospital	800 (14 houses in 30 m)	B247, Dummalasooriya – Kakkawila road, Dummalasooriya – Bingiriya road & B079
3	C.X. 33 kV Bowatte Gantry	1.10 km to School at Panawewa	2 km to School at Bingiriya	1.50 km to temple		2.50 km to Bingiriya hospital	125 (6 houses in 30 m)	B079
C.XIII.	33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry							
	Existing Route							

4.3.3 Environmental Impacts and Mitigation Measures Needed during Operation

113. Once gantry switching stations and lines are fully erected, fencing, danger signs must be installed at each that clearly identify and warn of the dangers of climbing into an operational substation. Signage meeting the IEEE¹¹ standards will need to be placed on all overhead towers warning of the electrical hazards. Erection, Procurement, and Construction (EPC) contractor will also need to advise the community about the location and associated dangers of the overhead feeder line.

4.4 Environmental Management Plan

114. The environmental management plan (EMP) has been prepared for the sub-project that discusses the anticipated impacts, monitoring requirements, and development of mitigation measures with respect to the following stages: (i) pre-construction, (ii) construction, and (iii) operation and maintenance. Detailed, site-specific mitigation measures and monitoring plans were developed and will be implemented during the project implementation phase.

115. The Environmental Management Plan (EMP) for the project is attached as **Annexure 5**, which identifies feasible and cost effective measures to be taken to reduce potential significant,

¹¹ Institute of Electrical and Electronics Engineers.

adverse, impacts to acceptable levels. Here, proper mitigation measures are proposed for each potential impact, including details on responsible parties for implementation of mitigation measures and supervision.

116. A summary environmental impact matrix and the mitigation measures are given in **Table 13** below.

Table 13: Environmental Impact Matrix

SI N ^o	Environmental Attribute	Potential Impacts	Nature of Impact	Magnitude of Impacts			Mitigation Measures	Implementation & Monitoring
				Low	Medium	High		
A. Physical Resources								
1.	Topography	Change in the surface features and present aesthetics due to the construction of the project.	Direct/Local/irreversible		X		The surface soil will be restored to normal slope after tower erection. If there is any excess soil, it shall be disposed off at suitable location. Any loss of vegetation will be attended by CEB as per existing GoSL norms	The surface soil will be restored to normal slope after tower erection. If there is any excess soil, it shall be disposed off at suitable location. Any loss of vegetation will be attended by CEB as per existing GoSL norms
2.	Climate	No impacts on the climatic conditions	Direct/Local/irreversible	X			No measurable impact on the climatic conditions, hence no mitigation is required	
B. Environmental Resources								
1.	Air Quality	Project will have marginal impact on air quality during the construction period due to increase in the dust emission.	Direct/Local/reversible	X			Water sprinkling at construction site, limited bare soils, maintenance of vehicles etc.	During construction activity
2.	Noise	Noise due to general construction activities.	Direct/Local/reversible	X			Restriction of noise generating activities at night and use of personal protective equipment like ear plugs, mufflers etc.	During construction activity
		Noise arising from humming noise from transformers	Direct/Local/reversible	X			To maintain a safe distance or provide proper shielding near residential areas	During operational phase
3.	Surface and Ground Water quality	Runoff from the construction site	Direct/Local/reversible	X			Careful siting of towers and gantry.	Before and during construction activity
		Domestic wastewater from construction sites	Direct/Local/reversible	X			During line and gantry construction, domestic wastewater treatment may be done by digging small ditches for waste water and then covering it with top soil once the construction team moves to next location.	During construction and operation
4.	Soils and Geology	Soil erosion due to erection and clearing of vegetation in the RoW.	Direct/Local/reversible				Avoiding sites, which are prone to soil erosion. Levelling of construction sites.	During and after the construction activity
C. Ecological Resources								
1.	Terrestrial Ecology	Loss of vegetation	Direct/Local/irreversible		X		Location of towers on non-cultivable land area. Selection of few access	Before the construction phase

SI N ^o	Environmental Attribute	Potential Impacts	Nature of Impact	Magnitude of Impacts			Mitigation Measures	Implementation & Monitoring
				Low	Medium	High		
							roads. Compensation for crop and trees (including plantation and home gardens) to villagers. The tree planting for forest land diverted to non-forest and trees felled will be done by the forest department and paid by CEB.	
2.	Terrestrial Fauna	Disturbance to the local fauna during construction	Direct/Local/reversible	X			Wildlife routes and their habitats have been avoided as far as possible during the route selection. Minimise encroachments, and indirect impacts.	Before and during construction phase
3.	Aquatic Ecology	Runoff water from construction site and labor camps.	Direct/Local/reversible	X			Ensure suitable setback for these temporary sites and ensure proper collection and treatment of waste water.	During construction and operational phase
3.	Aquatic Ecology	No significant impacts envisaged	Direct/Local/reversible		X		Appropriate setback for all construction and camp sites and proper disposal of wastewater waste to avoid polluting the river and streams. Care to avoid harming the aquatic ecology during construction of tower bases.	Before and during construction phase
D. Human Environment								
1.	Health and Safety	Fires, explosion and other accidents at the route alignment of MV line.	Direct/Local	X			Use of personal protective equipment during construction. By lopping of trees, fire hazards will be avoided during maintenance period. Regular inspection of lines for faults prone to accidents.	During construction and operation phase
		Exposure to electromagnetic fields	Direct/Local/continuous	X			MV lines do not cause too much EM fields	Before and after the construction phase.
2.	Agriculture	Permanent and temporary loss of agriculture land due to pole erection	Direct/Local/reversible	X			Avoid prime agriculture land. Assessment of land required and compensation. Construction activity in the field/cultivation area after crop is harvested and there after crop will not be sowed at the site until construction is complete.	Before and during construction phase.
3.	Socio-economics	Beneficial impacts from rural and urban electrification. Job opportunities during construction phase	Direct/regional		X		Unskilled labor and indirect benefits. Overall economic growth of the region.	During operational phase
4.	Resettlement	Resettlement of the house falling along the RoW.	Direct/Local/reversible	X			Route alignment is selected in such a way that there is no resettlement issue.	Before the construction phase.
5.	Cultural sites	No archaeological, historical	Direct/Local/	X			No archaeological, historical or cultural	During Design

SI N ^o	Environmental Attribute	Potential Impacts	Nature of Impact	Magnitude of Impacts			Mitigation Measures	Implementation & Monitoring
				Low	Medium	High		
		or cultural important sites are affected by the construction of the lines.	reversible				important sites are affected, hence no mitigation required	
6.	Traffic and Transportation	Traffic congestion due to movement of construction vehicles	Direct/Local/reversible	X			Avoid high density traffic areas, proper traffic signs at the construction site, ensuring proper access roads	During construction phase
7.	Solid Waste Generation	Probability of Surface and ground water pollution	indirect/Local/reversible	X			Minimisation, reuse and recycle whenever possible. Separated wooden and scrap will be collected and disposed of in compliance with applicable regulations and rules.	During construction and operation phase

5.0 INSTITUTIONAL REQUIREMENT AND ENVIRONMENTAL MONITORING PROGRAMME

5.1 Institutional Arrangements

117. According to the National Environmental Act (NEA), there exists a mandatory requirement to obtain the environmental clearance from the Central Environmental Authority or a Project Approving Agency (PAA) which is authorised under the NEA for any kind of power plants of prescribed capacity and transmission lines over 50 kV in capacity, and above 10 km in length. Therefore, the Ministry of Power and Energy has established an environment cell in the Planning Division to implement the requirements of NEA. CEB will be the Executing agency (EA) and the Implementing Agency (IA) for generation projects (Tranches 1 and 2). The Project Management Unit¹² headed by a Deputy General Manager, reports to the General Manager of CEB with appropriate staffing to represent the EA since the time of previous loans.

118. PMU has designated Environment Officer of Energy and Environment Division (EED) who has oversight responsibilities for monitoring of all sub-projects in areas such as Environment, R&R and Social safeguards. To assist EED in these specialist functions, CEB will hire appropriate Environment and Social Consultants at PIU level, as deemed necessary or as stipulated by CEA's environmental clearance to assist EED in day-to-day coordination and reporting of various subproject activities.

119. The duties of the EED will include at a minimum: (i) oversight of field offices and construction contractors for monitoring and implementing mitigation measures; (ii) liaising with the field offices and contractors and seeking their help to solve the environment-related issues of subproject implementation; and (iii) preparation of environmental management reports every 6 months (as required by ADB). EED must coordinate with PIUs for monitoring as well as designing appropriate mitigation measures to address environmental and social issues¹³.

120. The duties of the Environment Division at the corporate level:

- Monitoring and implementation of mitigation measures during design, construction and operation phases of the project.
- Coordinate the preparation of suitable environmental management reports at various project sites.
- Advising and coordinating field environmental management cells activity towards effective environment management.
- Liaise with the Ministry of Power and Energy (MoPE) and Central Environmental Authority (CEA), and other relevant agencies and seek their help to solve the environment related issues of the project implementation.
- Advise project planning cell on environmental and social issues to avoid negative environmental impacts.
- Provide training and awareness on environmental and social issues related to power transmission projects to the project staff.

121. The duties of the Environment Division at the Field level:

- Implement the environment policy guidelines and environmental good practices at the sites.
- Advising and coordinating the field offices activity towards effective environment management.
- Liaise with the forest department and seek help of forest officers in resolving environment

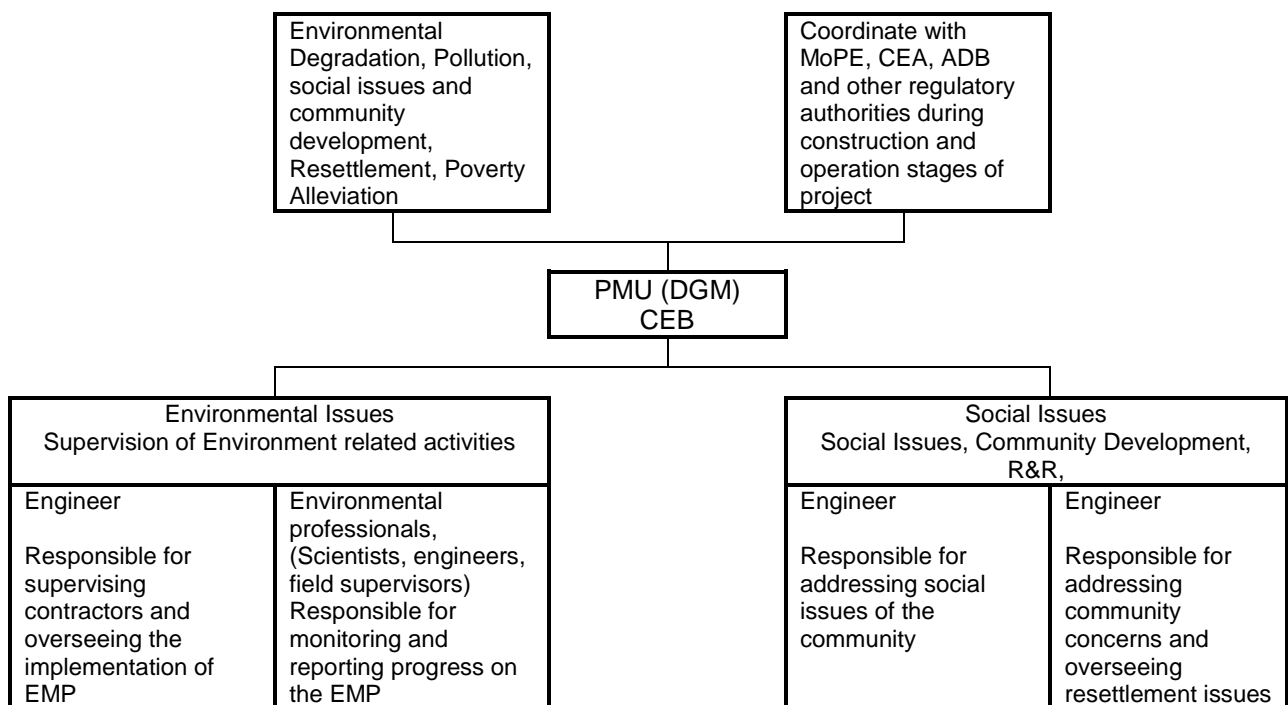
¹² PMU provides Institutional support for financial management and institutional capacity development to all PIUs.

¹³ ADB advises that all EAs develop in-house capability for environmental, health, and safety (EHS) program consistent with international best practices. The EHS program should include accounting for environmental benefits resulting from investment projects within three months of loan approval. The monitoring agency shall report on semi-annual basis directly to ADB and determine whether sound environmental management practices have been achieved, and suggest suitable recommendations and remedial measures for midterm correction and improvement.

- monitoring related issues.
- Carry out environmental and social survey in conjunction with project planning cell to avoid negative environmental impact.
- Make the contractor staff aware on environmental and social issues related to power transmission projects so that EMP could be managed effectively.

122. The mitigation measures suggested require monitoring of environmental attributes both during construction and operational phase of the project. The **Figure 13** below depicts the institutional organisation structure showing the various entities within CEB and their role vis-à-vis other government agencies.

Figure 13 Institutional Structures and Responsibility for Environmental Management Plan at Ceylon Electricity Board (CEB)



PMU = Project Management Unit, EMP = environmental management plan, MoPE = Ministry of Power and Energy, PIU = Project Implementation Unit

5.2 Monitoring of Environmental Management Plan (EMP)

123. The mitigation measures suggested require monitoring of environmental parameters - both during construction and operational phases of the project. The monitoring of the environmental aspects shall be ensured by EED. During the construction phase, the contractor should ensure that activities like handling of earth works, disposal of debris, storage of materials, labour camps, putting proper traffic signals is done properly to have minimum impact. This in turn should be monitored by the Project Manager of the individual distribution line/gantry subproject. The PIU will supervise the contractor. Other environmental good practices include sanitary waste management, noise abatement, maintaining hygienic conditions, maintenance of fire and safety equipment.

124. The EED will ensure that site engineers and contractors adhere and comply with all measures and procedures identified in the EMP. Activities to be monitored include: all planning, coordination and management activities related to the implementation of safeguard issues; the identification of corrective and preventive actions; records of health and safety matters and training activities; consultations with project affected people (as and when needed, particularly during the

implementation); feedback, trouble shooting and project related grievances; preparation of progress and monitoring reports as required by the ADB; and verifying the projects overall compliance with safeguard measures and its progress towards achieving the intended loan outcomes.

Environmental Parameters to be Monitored

125. To ensure that project would not generate negative impacts to the overall environment quality, monitoring of environmental parameter has to be performed by CEB/Contractor as per contract provisions. The monitoring activities of the project include site supervision, verification of permits, monitoring of water quality, soil, noise and air. Monitoring of the quality of water, soil, air and noise during the construction stage is the responsibility of the contractor by the approved government agency. The measurement of environmental parameters and its periodicity for the Project is summarised in **Annexure 6**.

Reporting

126. Mitigation measures related to construction as specified in the EMP will be incorporated into civil works contracts, and their implementation will be primarily the responsibility of the contractors. In addition, contractors will be required to submit monthly progress reports on the implementation of EMP measures to PIU/PMU. The PMU will report to the ADB on progress achieved against the EMP activities and milestones on a half-yearly basis. Progress reports will include a description of implementable activities and their status; identify the responsible parties involved in their implementation; and provide project management schedules and timeframes for doing so, along with their associated costs.

127. The EED after interaction with Project managers of PIUs will prepare and submit performance monitoring reports to the ADB twice in a year. This report will include the results of environmental monitoring to demonstrate that sound environmental management practices are applied, and the set environmental targets are achieved. The environmental monitoring report will be submitted by the PIU to the PMU, which will include the result of environmental monitoring into its environmental report. A sample Environmental report format is attached in **Annexure 8**.

128. In case the implementation of EMP measures is not satisfactory, CEB may engage external qualified experts to verify monitoring reports and assess the significant impacts and risks. These external monitoring experts will recommend actions for CEB to enhance environmental compliance. ADB will continue to monitor project compliance with ADB safeguard plans and requirements on an on-going basis throughout the duration of the contract.

5.3 Environmental Management Plan Budget Costs

129. The compliance with the EMP has been prepared based upon optimum and reasonable costs that are derived upon minimisation of mitigation measures on a “least-cost” basis. Without such expenditures, the project might generate significant environmental impacts, causing the biophysical environment in the area to deteriorate and indirectly depressing the economies of local communities. The main benefits of the mitigation plan are (i) ensuring that environmental standards are met during design, construction, and operation of the project; (ii) providing offsets to negate project impacts especially ecological impacts.

130. From the total project cost of USD 12.03 million (including IDC and contingencies), USD 0.08 million has been included as the Environmental Mitigation and Social issues (which includes EMP costs) as shown in **Table 14**. The compliance costs for minimisation of mitigation measures for the EMP has been arrived based on optimum and “least-cost” basis. Typically, the EMP costs will include:

- i. compensation for private land and fruit/non-fruit trees for proposed ROW,
- ii. compensation for crops in ROW and tower sites,
- iii. cost of compensatory afforestation,
- iv. cost for implementation of environmental mitigation measures, and

- v. cost towards monitoring costs, independent audit costs for the project.

Table 14: Summary of Estimated Costs including for Environmental Monitoring Plan (EMP) Implementation (in million USD)

Distribution Project Breakup – Tranche 1	C.I-II	C.III-IV	C.V-VI	C.VII-VIII	C.IX-X	C.XI	Total USD Million
Base Cost							
Civil works and erection	0.50	0.63	0.16	0.32	0.71	0.09	2.40
Equipment	1.05	1.34	0.34	0.67	1.52	0.18	5.11
Consultancy							
Project management, design & supervision	0.12	0.15	0.04	0.08	0.18	0.02	0.59
Capacity development	-	-	-	-	-	-	-
Spares	-	-	-	-	-	-	-
Base Cost Total	1.67	2.13	0.54	1.06	2.41	0.29	8.10
Environment Mitigation	0.02	0.02	0.01	0.01	0.02	0.00	0.08
Taxes and duties	0.28	0.36	0.09	0.18	0.23	-	1.15
Physical Contingency	0.08	0.11	0.03	0.05	0.12	0.01	0.40
Price Contingency	0.31	0.40	0.10	0.20	0.45	0.06	1.53
Financing charges							-
IDC	0.15	0.20	0.05	0.10	0.22	0.03	0.75
Commitment charges	0.00	0.01	0.00	0.00	0.01	0.00	0.02
Total	2.53	3.23	0.81	1.61	3.47	0.39	12.03

Source: DPR reports from CEB # Consists of all EMP, Environmental Monitoring costs

Legend

COMPONENT C.I-II Vavunathivu - Thalankuda 33 kV
 COMPONENT C.III-IV: Vavunathivu - Kaluwanchikudy 33 kV
 COMPONENT C.V-VI: Vavunathivu - Urani 33 kV
 COMPONENT C.VII-VIII: Vavunathivu - Karadiyanaru 33 kV.
 COMPONENT C.IX-X: Madampe - Bowatte 33 kV.
 COMPONENT C.XI: Wellampitiya to Ambathale Gantry

5.4 Critical Environmental Review Criteria

(i) Loss of irreplaceable resources

131. The rural electrification projects do not involve any large-scale excavation and land lost is insignificant. The EMP includes compensation for the loss by minimising the impact of loss of vegetation as per existing norms under the Forest (Conservation) Act, 2002. There will be no net biodiversity loss in this project due to the afforestation being done by Department of Forests.

(ii) Accelerated use of resources for short-term gains

132. The project will not use any natural resources occurring in the area during construction as well as its operation cum maintenance phases. The construction material such as tower material, cement etc. shall come from factories mostly from abroad, while the excavated soil shall be used for backfilling and revetment to restore the surface. Thus, the project shall not cause any accelerated use of resources for short-term gains.

(iii) Endangering of species

133. Very few endemic species of flora and fauna exist in the project area and adjoining forest areas, but the project activities will not threaten or cause their extinction. This is because all distribution projects are situated in dry zone of Sri Lanka whereas more than 80% of endemic flora and fauna is normally found in the wet zone. Habitat in the project area is not critical because in Sri Lanka elephants¹⁴ often raid crop lands, paddy fields, home gardens etc. outside protected areas. There are many elephants in protected areas but they visit outside the protected areas mainly for food. But these areas are not critical habitat since the elephants only occasionally visit these human habitation.

¹⁴ According to the National Redlist (2012) elephants are endangered species.

(iv) Promoting undesirable rural-to urban migration

134. The project will not cause any submergence or loss of land holdings that normally trigger migration. It also does not involve acquisition of any private land holdings. Hence, there is no possibility of any migration.

(v) Increase in affluent/poor income gap

135. The distribution project will increase availability and reliability of power. Power is a key input to the economic development of any area. Experience indicates that economic development leads to generation of more jobs, which in turn should raise the living standards of poor. Thus, the project will contribute to reduction of affluent/poor income gap by providing opportunities for employment and rural based economic activities.

6.0 GRIEVANCE REDRESS MECHANISM

6.1 Awareness of Stakeholders

136. During Public consultation sessions of the IEE study, the discussions with groups and individuals were conducted to make them aware of the proposed project. Thus, the project-affected community residing beside the proposed distribution line has gained a reasonable knowledge about the potential grievances, which will arise in the future.

137. A community awareness programme must be conducted one month prior to construction by the Project Implementation Unit (PIU) of CEB regarding the scope of the project, procedure of construction activities, utility of resources, identified impacts and mitigation measures. These awareness programmes will help the community to resolve problems and clarify their distrusts related to the proposed project at initial stage.

138. The community should be informed about the Grievance Redress Mechanism (GRM), procedure for making complaints, including the place and the responsible person to contact is already established by the Public Utilities Commission of Sri Lanka (PUCSL). Almost all the stakeholders related to the GRM must be made aware of the established grievance process, the requirement of grievance mechanism, goals, benefits, relevant laws regulations etc. PUCSL Act lays down procedures for Grievance Redressal for lines as attached in **Annexure 7**.

6.2 Grievance Redress Mechanism and PUCSL

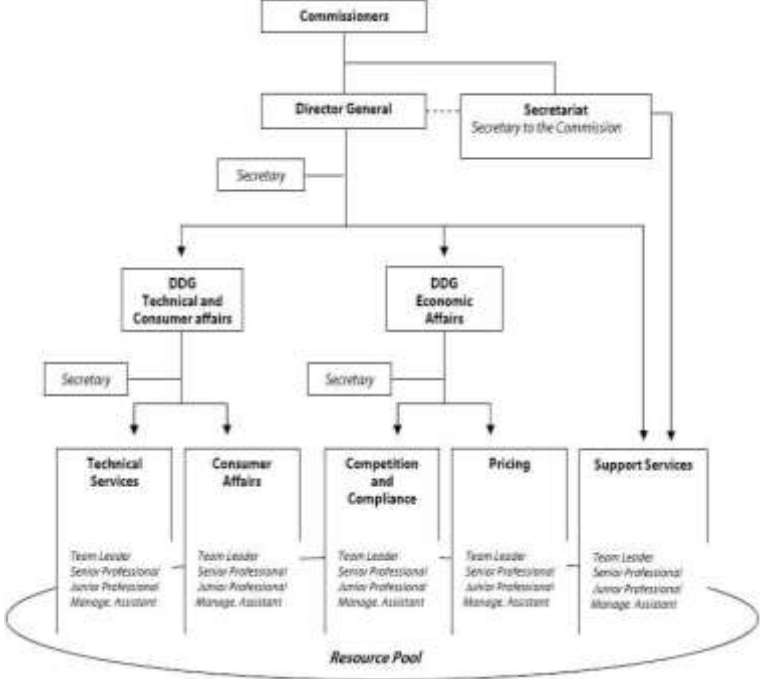
139. The Grievance Redress Mechanism (GRM) for the infrastructure development project provides an effective approach for complaints and resolution of issues made by the affected community in a reliable way. This mechanism will remain active throughout the life cycle of the project. Thus, Public Utilities Commission of Sri Lanka (PUCSL) Act creates an environment for all inhabitants of Sri Lanka and the contributors to its development, to have access to essential infrastructure and utility services in the most economical manner within the boundaries of the sustainable development agenda of the country. PUCSL's mission is to regulate all the utilities within its purview, to ensure safe, reliable and reasonably priced infrastructure services for existing as well as future consumers in the most equitable and sustainable manner. **Figure 14** depicts the PUCSL hierarchy.

140. All the members in PUCSL need to be informed by the PIU regarding procedures of GRM. The information should include procedures of taking/ recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders etc. PUCSL has a standard mechanism of (i) informing the affected people GRM and its functions, (ii) how peoples representatives in the GRC will be selected, (iii) procedure and the mechanisms adopted for making the complaints, (iv) supporting the complainants in communicating their grievance and attending the GRM meetings and (v) implementing compliance to a GRMs' decision, its monitoring and communication to the people. Periodic meetings of PUCSL are to be conducted by the PIU so that all the members of the PUCSL are familiar with the problems and responses received by individuals in the PUCSL.

141. CEB does not have any specific Environment or Social Safeguards Policy regarding generation/transmission/distribution subprojects currently. ADB procedures require CEB to establish a Grievance Redress Mechanism (GRM) having suitable grievance redress procedure to receive and facilitate resolution of affected peoples' concerns, complaints, and grievances about the subproject's environmental performance. The GRM will aim to provide a time-bound and transparent mechanism to voice and resolve social and environmental concerns linked to the project. A common GRM will be in place for social, environmental or any other grievances related to the project. The GRM will provide an accessible and trusted platform for receiving and facilitating resolution of affected persons' grievances related to the project. The GRM procedure for the project is outlined below, which follows a time-bound schedule, with responsible persons identified

to address grievances and seek appropriate persons' advice at each stage, as required.

Figure 14: Responsibility Hierarchy of PUCSL



142. The grievance mechanism will be scaled to the risks and adverse impacts on environment due the subproject type, size, type of area (sensitive area) and impacts. It should address affected people's concerns and complaints promptly, using a transparent process that is gender responsive, culturally appropriate, and readily accessible to all segments of the affected people at no costs and without retribution. This GRM would consist of a Grievance Redress Committee (GRC) headed by the Project Head. The committee would consist of the following constitution as listed in **Table 16**.

Table 16: Constitution of Grievance Redress Committee

1	Project Head, CEB
2	Division Secretary or their nominee
3	Representative of Gram Niladhari/Council
4	Women representative of village/council
5	Representative of EPC* contractor
6	Environment Officer at PMU or nominee

* (EPC) - Engineering, Procurement and Construction Contractor

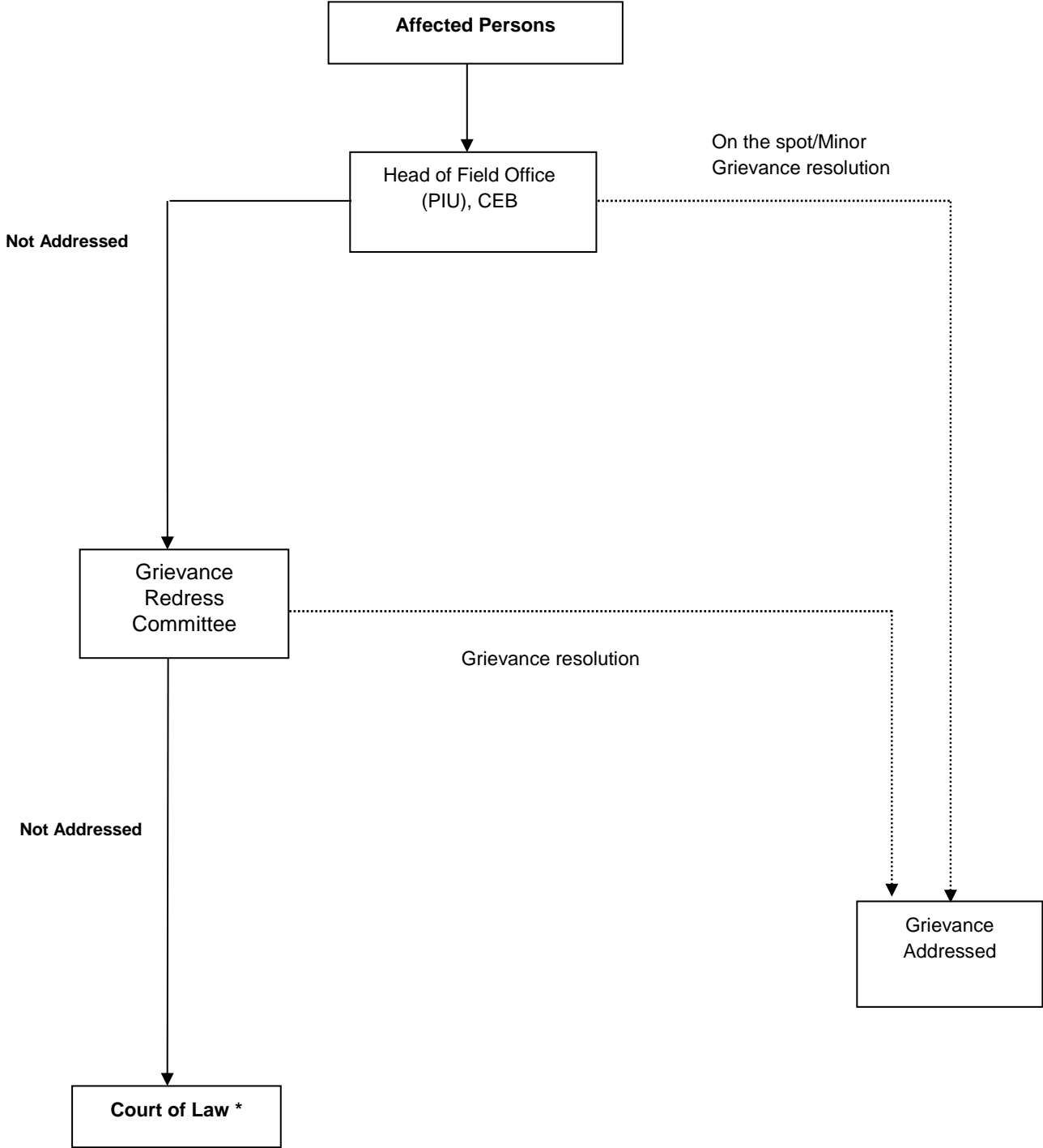
143. This Grievance Redress Mechanism (GRM) would provide an effective approach for resolution of complaints and issues of the affected person/community. Project Management Unit (PMU) shall formulate procedures for implementing the GRM, while the PIUs shall undertake GRM's initiatives that include procedures of taking/recording complaints, handling of on-the-spot resolution of minor problems, taking care of complainants and provisions of responses to distressed stakeholders etc. paying particular attention to the impacts on vulnerable groups.

144. Grievances of affected persons (APs) will first be brought to the attention of the Project head of the PIU. Grievances not redressed by the PIU will be brought to the Grievance Redress Committee (GRC) set up to monitor subproject Implementation for each subproject affected area. The GRC will determine the merit of each grievance, and resolve grievances within an outer time limit of three months of receiving the complaint. The proposed mechanism does not impede access

to the country’s judicial or administrative remedies. The AP has the right to refer the grievances to an appropriate courts of law/PUCSL if not satisfied with the redress at any stage of the process.

145. The PIU will keep records of all grievances received including: contact details of complainant, date that the complaint was received, nature of grievance, agreed corrective actions and the date these were effected, and final outcome. The flow chart showing Grievance Redress Mechanism is presented in **Figure 15**.

Figure: 15: Flow chart showing Grievance Redress Mechanism



(*) Affected Persons can approach the court of law/PUCSL at time during the Grievance redress process.

7.0 PUBLIC CONSULTATION AND INFORMATION DISCLOSURE

146. In line with National Environmental Act (2002) in Sri Lanka, public consultation and information disclosure will be undertaken through public notice prior to the approval by CEA for the particular project. According to ADB SPS 2009, public consultation and information disclosure is to be made during the initial stages by the client itself. This activity supports the view to understand the public's perception of the project and respond to their concerns and suggestions during the early stages of the project design. Incorporation on the environmental concerns to the decision making process through the public consultation will avoid or minimise conflict situation during the implementation process.

147. Public consultations were conducted in project-affected area between 1 November 2013 to 25 January 2014. The community aired their opinions freely on the project, its impact, and suggestions for mitigating adverse impacts. People participated in voluntary public consultation sessions to express their views about the proposed project. **Table 16** indicates a summary of public consultations conducted during the field survey. The transcript of these discussions will help CEB and the EPC contractor conduct a proper needs assessment to ensure the issues raised by people are addressed appropriately.

Table 16: Public Consultations

SNo	Name of the Component /Site	Name of the Village, Gramasevaka Division, District, Province	Distance from Project Location	Names of the Participants
1	C.I. 33 kV distribution line Vavunathivu GSS to Thalankuda (21 km)	Vavunativu, Kunchamunai, Mandapattadi, Urasery, Illupalydichenai, Munalikkadu, Paddipalai Batticaloa, Eastern Province	0.5 km	Mr. L. Savithri, Mr. Chandaradevi, Ms. Devaki, Ms. Suhandi, Mr. R. Prabaha, Mr. S. Maheswaram, Mr. Manikkapodi Thillempalam, Ms. Maheshwari, Mr. Sinnathambi Winahayalsingam, Ms. Allimuttu, Ms. Krushna Kumari, Ms. Nishanthini, Ms. Parimalakanthi, Ms. Thevarani, Ms. Rajeshwary, Ms. Thangeshwary, Ms. Nakamma, Ms. Prisatharsini, Ms. Kamaleswary, Ms. Thajanithy, Ms. Jegantha, Ms. Uma, Ms. Palaththai, Mr. S. Jeyakumar, Mr. T. Kathukamaththamai, Mr. N. Pavanathan, Mr. N. Perelasinjan, Mr. A.Suntheralingam, Mr. S. Suntheralingam, Mr. P. Amithalingam, Mr. S. Thirukganesh, Mr. J. Susila, Mr. P. Arasamma, Mr. K. Velajutham, Mr. K. Pushparani, Ms. N. Sodimalar, Mr. T. Thanshwaran, Mr. M. Thayaparan, Mr. K. Yogarajah, Mr. V. Punniyamoorthy, Mr. N. Keerthi, Mr. K. Muthulingam, Mr. N. Elango, Ms. R. Kalanithi, Ms. R. Alakammah, Ms. G. Thavasothini, Ms. S. Sandira, Ms. K. Rajini, Ms. K. Kiritha, Ms. S. Shanthi, Ms. P. Jeyamalini (Women- 25)
2	C.II. 33 kV Thalankuda Gantry	Thalankuda	0.4 km	
3	C.III 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	Vavunativu, Kunchamunai, Mandapattadi, Urasery, Munalikkadu, Paddipalai, Kadukkamunai Vanninagar, Paddapuram, Periyaporativu, Munaitivu & Kaluwanchikudy, Batticaloa Eastern Province	0.5 km	Mr.V. Ranjan, Mr.K. Vithyarahaj, Ms.Y. Yohini, Ms.N. Kokilawani, Ms. S. Kala, Ms. Y. Suganthini, Ms. R. Kayalvili, Ms. P. Yalini, Ms. V. Rewathi, Ms. T. Krishnavery, Ms. M. Selvi, Ms. S. Thevaledsumy, Ms. K. Pakkiam, Mr.S. Thangavel, Mr.M. Velupillai, Mr.K. Manoranjan, Mr. A.Ranjithamalar, Mr.K. Paramanathan, Mr.K. Manoharan, Mr.T. Ganeshan, Ms.Thirumahal, Ms.N. Nalini, Ms.M. Pathmawathi, Ms.V. Rukmanie, Ms.R. Indumathie, Mr.M. Alagathirai, Ms.M. Maheswary, Ms.T. Srimathi, Ms.M. Induka, Mr.S. Ponniah, Mr.S. Inparany, Mr.T. Sundaralingam, Ms.S. Nallammah, Mr.S. Santhira, Ms. V. Mathivaththani, Mr. A.Thogiri, Ms. P. Punkalali, Mr.P. Manikkarasa, Mr.N. Yogarasa, Mr. T. Satheeswaran, Mr.P. Piratheepan, Mr.K. Ponnampalam, Mr.T. Theivanayagam, Mr.K. Kanagasundaram, Mr.K. Kuyalavan, Ms. P. Parameswary, Ms. S. Mahaledusmi, Ms. R. Arasamma, Ms. S. Kosalathevi, Ms. S. Yakam, Ms. S. Periyranayaki, Ms. J. Maheshwary, Ms. L. Puvaneswary, Ms. T. Nagavalli, Ms. K. Nallamma, Ms. P. Thiyakaraja, Ms. M. Lilavathi, Ms. V. Sarasathevi, Ms. K. Srikala, Ms. I.Paransothi, Ms.T. Pavalakkodi, Ms.S. Valarmathi, Ms.K. Thusyanthi, Ms.K. Kirusnapriya (Women – 42)
4	C.IV 33 kV Kaluwanchikudy Gantry	Kaluwanchikudy	0.4 km	

SNo	Name of the Component /Site	Name of the Village, Gramasevaka Division, District, Province	Distance from Project Location	Names of the Participants
5	C.V. 33 kV distribution line Vavunathivuv GSS to Urani (6 km)	Thirupperunthurai, Eachchantheevu, Navatkaadu, Mankikaddu & Vavunativu, Batticaloa, Eastern Province	0.5 km	Mr.D.S. Indrakumar,Mr.T. Yogeswaran,Mr. A.Kalaeineshan,Mr.M. Thevaswaram,Mr.S. Thevarajah,Mr.R. Pirakalathan, Mr.S. Krishnapillai, Mr. A.Ramachandran,Mr.K. Suthan,Mr.V. Rajendran, Mr.N. Visakesan, Mr.V. Vinothkumar,Mr.S. Kiruparetnam, Mr.K. Anojan, Mr.V. Shanmugashanthi, Mr.J. Rujitha, Mr.A.Parimalan, Mr.S. Pankiraj, Mr.A.Sasikumar, Mr.Ganeshmoorthi, Mr.Murukaiah, Ms.Priya, Ms.Tharsini, Ms.Thavamalar, Ms.Kokala, Ms.Mathi, Mr.Aruna, Mr.Ravichandaran, Mr.Ramanan, Mr.Muralitharan, Mr.Aselan, Ms.Nanda, Ms.Mehala, Ms.A. Kamalawathie,Ms. Rasammah, Ms.V. Veerathankal, Ms.V. Poonkothai, Ms.V. Pulenthiran, Mr.M. Selvam, Mr.K. Kajamohan, Mr.S. Vasantharasa, Mr.N. Sampanthan, Mr.K. Ravindran, Mr.K. Sinkarasa, Mr.T. Puvanendrarajah, Mr.S. Kathirkamathampy, Ms.K. Pakkiam, Mr.S. Udayaledsumy, Ms. R. Vasanthi, Mr.K. Menaka, Mr.V. Vijayaledsumy, Mr.S. Jeyakkumary, Ms.K. Parameswary, Ms.N. Yasanthinithivi (Women - 16)
7	C.VII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (13 km) C.VIII. 33 kV Karadiyanaru Gantry	Vavunativu, Palakkadu, Iththiyadimadu, Ayittiyamalai Nariippulthottam & Karadiyanaru, Batticaloa, Eastern Province Karadiyanaru	0.3 km 0.5 km	Mr. K. Tharmarajah, Mr. J. Rakukaran, Mr. S. Kanapathipillai, Mr. T. Theyventhiman, Mr. T. Seenalathvea, Mr. K. Soothilbakam, Mr. M. Ravi, Mr. N. Sivanesarasan, Mr. K. Kanthasumu, Mr. K. janakaraj, Mr. P. Nishanth, Mr. S. Thinojan, Mr. P. Prashath, Mr. M. Lokitharasha, Mr. V. Ajanthan, Mr. Prasath, Ms. Manaoraj, Mr. Marimumu, Mr. Rajanayagam, Mr. M. Gunasekeram, Mr. R. Kankesan, Mr. P. Sathanayake, Mr. T. Yogarani, Mr. S. Balanedran, Mr. K. Parameshwary, Mr. T. Arunthathy, Mr. R. Latha, Mr. R. Kavitha, Mr. M. Tharsini, Mr. K. Chandran, Mr. K. Jeyanthi, Mr. J. Swarna, Mr. R. Vadivel, Mr. A.Premalathevi, Mr. E. Perinparajah, Mr. G. Somu, Mr. S. Mathiratham, Mr. K. Marimuththu, Mr. L. Suthamathy, Ms. A.Malathy, Ms. S. Nirmala, Mr. R. Thenledsumy, Mr. N. Kumaleswary, Mr. J. Aruljothy, Ms. V. Manoranjitham, Mr. S. Selvarathnam, Mr. V. Veerakuddy, Mr. V. Vadivel, Ms. S. Kumutha, Ms. S. Subasini, Mr. S. Rusikaran, Ms. P. Lalitha, Ms. V. Thasalachumy, Ms. N. Kuneshwary, Ms. M. Nagalechchmai, Ms. V. Nanthini (Women – 10)
9	C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km);	Bowatta, Kaduruwawa, Galisapitiya,Suduwella, Hedabandaragama,Galmuruwa, Kochakaduwa, Watuwatta, Puttalam/K'gala, NW province	0.5 km	Mr.W.L. Shiroman Nilantha, Mr.B.M. Asoka Somasiri,Mr.W. Mahesh Madushanka, Mr.W. Dinesh Priyadarshana, Mr.W. Dilhan Pushpakumara, Mr.H.A. Jayalath Kumara, Ms.Deepika Pushpakumari, Mr.R. V. Nandani, Mr.M.A. Madwanthi, Mr.Sarath Ekanayake, Ms.Swarna Kanthi, Ms.Seelawathi, Mr.H.P. Jayarathne, Mr.Chandani Gunasena, Mr.Thushari Inoka, Mr.Cyril Mudannayake,Mr.W.P. Senarath, Mr.K.P. Dharmadasa, Mr.H.M.N. Hemamali, Mr.N.P.S. Rohan, Mr.W. Leelarathne,Mr.M. Adhikari, Mr.Kamal Chandrakumara, Mr.H.M. Maheepala, Mr.Lakshmi Crooz, Mr.W. Marshal, Mr. Jayaseeli Rathnamala, Mr. Stanley Siriwardena, Mr.Priyanka, Warnakulasooriya, Mr.P.M. Pradeep, Mr.P.F. Senevirathna, Mr.S.A.S. Senevirthne Mr.E.S. Senevirathne, Mr.T. Ananda, Mr.P. Wininona, Mr.Jeewananda, Mr.Kamal Pemasiri, Mr.Sumanawathi, Mr.Nimali Wasantha, Mr.H.P. Jayasena, Mr. U.P. Leelawathi, Mr.A. Jayasena, Mr. H.A. Jagathlal(Women – 4)
10	C.X. 33 kV Bowatte Gantry	Bowatte	0.5 km	Mr.W.L. Shiroman Nilantha, Mr.B.M. Asoka Somasiri,Mr.W. Mahesh Madushanka, Mr.W. Dinesh Priyadarshana, Mr.W. Dilhan Pushpakumara, Mr.H.A. Jayalath Kumara, Ms.Deepika Pushpakumari, Mr.R. V. Nandani, Mr.M.A. Madwanthi, Mr.Sarath Ekanayake, Ms.Swarna Kanthi, Ms.Seelawathi, Mr.H.P. Jayarathne, Mr.Chandani Gunasena, Mr.Thushari Inoka, Mr.Cyril Mudannayake,Mr.W.P. Senarath, Mr.K.P. Dharmadasa, Mr.H.M.N. Hemamali, Mr.N.P.S. Rohan, Mr.W. Leelarathne,Mr.M. Adhikari, Mr.Kamal Chandrakumara, Mr.H.M. Maheepala, Mr.Lakshmi Crooz, Mr.W. Marshal, Mr. Jayaseeli Rathnamala, Mr. Stanley Siriwardena, Mr.Priyanka, Warnakulasooriya, Mr.P.M. Pradeep, Mr.P.F. Senevirathna, Mr.S.A.S. Senevirthne Mr.E.S. Senevirathne, Mr.T. Ananda, Mr.P. Wininona, Mr.Jeewananda, Mr.Kamal Pemasiri, Mr.Sumanawathi, Mr.Nimali Wasantha, Mr.H.P. Jayasena, Mr. U.P. Leelawathi, Mr.A. Jayasena, Mr. H.A. Jagathlal(Women – 4)
11	C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry		0.5 km	Mr. P. Gamini, Ms.R.M. Thilini, Ms. W.A. Kusumawathi, Mr. Sunil Ranasinghe, Ms. Lalani ranasinghe, Mr. B.A. Priyaratne, Mr. J.D. K. Ruwan, Mr. A.D. Wickremaratne, Ms.I .H. Falina, Ms. Muneera, Mr. P.M. Athula, Ms. L. Charlet, Ms. B. Chandani, Mr. Kosala, Mr. P.D.A. Jayasiri, Mr. L. Vinodh Madushanka, Mr. P.W. Gayan Chinthaka, Mr. M.S.A. Costa, Ms. Nandani, Ms. Naddeka Dilangani, Mr. P.W. Amerasinghe, S.A. Samarapala, Mr.H.H. Darshana, Mr. P.M. Gunasena, Mr.S.B. Kumarasiri, Ms. Y.D. Asoka Malkanthi, Ms. S.M. Senevirthna, Mr. H. Senevirathna, Mr. P.M. Athula, Mr. K.D.S.P. Kumara, Mr. M.G.R. Pinto, Ms. H.T. Renuka, Mr. B. Hettiarachchi (Women – 11)

7.1 Consultation Findings

C.I-II. Vavunathivu - Thalankuda 33 kV.

148. At Kurinjamunai, villagers have no objection to the project. The paddy fields on which the distribution line (D/L) traverses belongs to people living elsewhere. They were concerned about the voltage levels, as well as dangers to their lives during rainy season because the gantry will be built in water logging area. They also wanted to know about distance of the D/L from the main road and the tower locations. They suggested that D/L should be erected on the left hand side of the road where lesser number of houses are located. Also, that compensation should be paid to villagers who would lose their crops and cultivations. There are 105 households (HHs) and there is a primary school, zonal education office, 2 restaurants and 3 shops in the village and the HHs own about 10-15 acres of land out of which 75 HHs own paddy land extending to 1-2 acres. Only a single season is cultivated. At Thandiyady, there are 264 HHs and the public infrastructure includes a school, a hospital, a Hindu Kovil, Agrarian Service Centre, Samurdhi bank and veterinary office. At Vaalakalai villagers have been living here for several years. There are 130 HHs and there is a Hindu Kovil, a pre-school and the RDS building. About 10 HHs own paddy land.

C.III-IV. Vavunathivuv - Kaluwanchikudy 33 kV.

149. Mawathkuda villagers have no objection to the D/L but inquired about the location of the transformer to be installed and the voltage level. There are 32 who own 20 perches of private land. There is a primary school, a Hindu kovil and one retail grocery. At Vaalakalai, villagers inquired whether the D/L would replace the existing line that passes through the village, whether the paddy fields would be acquired by the CEB and the type of compensation entitlements for lost trees. At Valkaddu, the paddy fields over which the D/L would traverse belongs to 3 farmers from this village where they own about 3 acres. They are living in this village for more than 100 years. There are 85 HHs and there is a primary school (upto Year 5), a pre-school, a community centre built by CARE International and 4 retail groceries.

C.V-VI. Vavunathivu - Urani 33 kV

150. Eachanthievu villagers inquired whether there will be lightening effects on the lives of lagoon fishermen as the D/L traverses across the lagoon. Also, whether people can get labour work during construction period. They also inquired about RoW of the D/L, implementation date and the voltage. They also requested that the 11 kV line that traverses over their houses now be shifted to some other place as it is dangerous for their individual and community life. The owners of the land over which the proposed D/L would traverse live in Urani and one person in Canada. There are 341 HHs and each HH would have 10 perches of land; of this around 80 HHs have paddy land with extents of 5 acres per HH. Another 3-4 HHs have 10-15 acres of paddy land. There is a public library, Pradeshiya Sabha sub-office, Child Fund office, a secondary school, a pre-school, a Kovil, and a fishermen's Society building. At Thiruperumthurai, there are around 500 HHs live in this GND and the average land holding size of a HH is 40 perches. About 15 HHs own paddy land and there is a school, temple, kovil, cooperative store, multi-purpose community centre, handicraft making centre and 7 retail groceries. At Manikkaddu, the paddy land on which the D/L would traverse belongs to families living in Kaththankudi and Kallady. About 10 villagers work as labourers in those paddy fields. One HH has taken some land on lease from its owners. Villagers have been living in this village for several years. There is a pre-school, a nursery, fishermen's society community centre, 2 kovils and 4 retail groceries.

C.VII-VIII. Vavunathivu - Karadiyanaru 33 kV.

151. At Salambakerney village, CEB has put the landmarks for the D/L very closer to 5 houses near Kali Kovil. They wanted to know if the line will be dangerous (lightning strikes) for them and if the route could be changed; or CEB would pay compensation for any loss of trees and cultivations. They have no objection provided they are paid compensation for the loss of trees. In a previous electricity line project, compensation was paid for some people but not for everybody for loss of their trees. Contractors dug holes but they did not fill them up after the work was over. If the line

goes over the paddy fields, they have no problem. If crops are damaged, farmers should be paid compensation. Nellur village has notified 15 HHs requesting permission to enter their paddy fields to install towers. There are 253 HHs and there is a primary school, a government weaving centre, a palmyrah production centre, a church, a kovil and about 6 retail groceries. This is a settlement where families have been living since 1952. They were given 3 acres of highland and 5 acres of paddy land at the time of their settlement. At Salambakerney, there are 40 HHs in this village and each household owns about 15 perches of highland. Except for a community centre, there are no other public buildings. There are 2 retail groceries.

C.IX-X. Madampe - Bowatte 33 kV.

152. At Panawewa, villagers may not like this D/L project. CEB has already demarcated the line route. They feel that it should not be installed over private property because already there are two lines that go over habitable lands. They felt that land values will go down if towers are installed. Compensation paid for trees is not adequate. Compensation should be based on the loss of future value of land and cash compensation should be given for crop losses. They were concerned about towers being installed on highlands above the tank and over some private properties. It may damage some coconut trees. Compensation cannot replace the potential value of a coconut tree. They suggested that D/L is taken over the government's forest reserve in Kaduruwewa (teak plantation) or the government farm (Ruk aththana farm) and then connect to the paddy field to minimize damages to private properties and trees as they will not be able to grow any coconut trees thereafter and the land values will decrease. The school principal was against the line traversing closer to the school and would prefer if underground cables are laid or the lines are installed above the existing 132 kV and 33 kV lines so that additional space is not required. They will not be able to construct buildings by the roadside if these lines go over the land. There are about 900 HHs in the village. 80% of the land is private while 20% is government land. However, 90% of the land is highlands whereas only 10% is paddy fields. Distance to Bingiriya town is 2 km and 1 km to Bowatte. There are several government service providing agencies, and temples and churches located within a range of 2 km. There are about 600 HHs in this village. There is a church and a temple. 70% of the land is State land given by the government. There are large coconut plantations, which are private land. At Kaduruwewagama, there are about 50-60 HHs around Kaduruwewa tank. Land below the tank is irrigated land. 70% of the land is private property of the people. Some HHs have paddy lands ranging from 1-2 acres. At Hiruwalpola village, there are about 70HH where every HH has 2-5 acres of coconut land and 1-5 acres of paddy land. Paddy is cultivated in two seasons a year. Some people cultivate more than 5 acres taken on lease. At Suduwella, there are about 250-300 HHs. 85% of the land is state land given to people in 1956. Government deeds have been granted to the people.

8.0 FINDINGS AND RECOMMENDATIONS

153. Impacts are manageable and can be managed cost effectively - environmental impacts are likely to result from the proposed distribution system development. Careful mitigation and monitoring, specific selection criteria and review/assessment procedures for candidate subprojects have been specified to ensure that minimal impacts take place. The detailed design would ensure inclusion of any such environmental impacts that could not be specified or identified at this stage, are now taken into account and mitigated where necessary. Those impacts can be reduced through mitigation measures such as correction in work practices at the construction sites, or through the careful selection of sites and access routes.

154. The proposed project will have a number of positive and negative impacts on the existing environment. Significant improvement in the quality and reliability of the electricity supply to the project affected area according to current demand is the main positive impact. In addition, electricity supply will help agricultural activities, students and public, increase land value, create lot of income generating activities, enhancement of safety at night, and increase mobility during night.

155. Environment pollution due to cut and fill operations, transportation of construction materials, disposal of debris, nuisance from dust, noise, vehicle fumes, black smoke, vibration etc. due to construction activities are the short term negative impacts due to proposed project.

156. Proper GRM will have to be implemented through PUCSL to overcome public inconvenience during the proposed project activities.

15. Benefits far outweigh negative impacts - the proposed project will improve operational efficiency and quality of power, reliability of the system and at the same time will reduce losses. Supply of power to the region will boost economic development of the area by strengthening the power distribution infrastructure. Overall, the major social and environmental impacts associated with distribution projects are limited to the construction period and can be mitigated to an acceptable level by implementation of recommended measures and by best engineering and environmental practices. The impact matrix depicts that the project will not have significant negative environmental impacts and the project would help in improving the socio-economic conditions of this developing state. Although the overall environment category for Tranche 1 projects is Category 'A', the environmental classification for the sub-project component C is "Category B" and does not require an EIA.

9.0 CONCLUSIONS

157. In accordance with the ADB's Safeguard Policy Statement 2009, the proposed distribution component "C" is categorised as "Category B". Thus, a full Environmental Impact Assessments (EIA) for the project is not required. Distribution projects require land only for gantry based switching stations but do not require land for laying the distribution lines. Wherever possible, the alignment is sited away from major settlements to account for future urban expansion. Forests areas and thick vegetation areas are avoided wherever possible; however, route alignment passes through scrublands, cultivated paddy fields, rubber cultivations, rubber plantations, tea cultivations etc. The lines will also pass through degraded forest areas but avoid any national park or sanctuary. The alignments in this project have also avoided wetlands and geologically unstable areas, which can also pose foundation related problems. Land will only be purchased/acquired for one gantry based switching station but no land will be required for placing distribution towers on private land thereby avoiding any relocation of project affected people.

158. The proposed construction activities will cause significant environment impact and most of the potential environment impacts are temporary in nature mainly restricted to pre-construction and construction periods. The Environment Management Plan (EMP) and the Environment Monitoring Plan (EMoP) have been prepared for the project and responsibilities for implementation assigned. The anticipated environmental impacts can be easily mitigated through implementation of EMP.

159. Overall, the social and environmental impacts associated with distribution project are limited to the construction period and can be mitigated to an acceptable level by implementation of recommended measures and by best engineering and environmental practices.

Annexure 1 Applicable Environmental Policy and Procedures

Name	Scope and Objectives	Key Areas	Operational Agencies / Key Players
Agrarian Services Act (N ^o 58 of 1979) Agrarian Development Act N ^o 46 of 2000	To provide secure background to farmers and their agricultural premises	Regulates the acquisition of land that belongs to paddy and other activities, which are related to agricultural areas.	The Ministry of Agriculture Development and Agrarian Services
Ceylon Electricity Board Act , 1969	To provide for the establishment of an electricity board for the development and co - ordination of generation	Enters with joint schemes by such board with any government department or approved body for the generation of electrical energy, the irrigation lands, control of floods or other like objects, and to make provision for all matters connected there with or incidental thereto.	Ceylon Electricity Board
Electricity Act 2009	To provide reliable and cheap electrical energy	Regulates the generation, transmission, transformation, distribution, supply and use of electrical energy	Ceylon Electricity Board
Fauna and Flora Protection (Amendment) Act 1993 (N ^o 49 of 1993).	To provide greatest protection to fauna and flora	Makes provision for the establishment of protected areas, regulates human involvements to such areas and their fauna and flora.	Department of Wild Life and Department of Forest
Felling of Trees (Amendment Act N ^o 01 of 2000 and Act to Amend felling of trees control)	The control removal of trees.	Regulates the removal of trees relevant to type and the compensation	Department of Forest
Fisheries and Aquatic Resources Act 1996	To provide for the management, regulation , conservation and development of fisheries and aquatic resources	Restricts detrimental or risk activities for aquatic fauna and flora	National Aquatic Resources Research & Development Agency (NARA) and CEA
Flood Act N ^o 22 of 1955	Protection of areas subject to flood	Flood prevention	Department of Irrigation
Forest Ordinance Act N ^o 13 of 1966 Forest (Amendment) Act N ^o 65 of 2009	Conservation, protection and management of forest and forest resources for control of felling and transport of timber	Definition of Conservation Forest, Reserve Forest, Village forests	Forest Department
Irrigation Clauses Act 1973	To provide regulations for the construction of structures across the irrigation canals and water resources.	Regulates the construction of structures across the irrigation canals and water resources.	Department of Irrigation
Land Acquisition (Amendment) Act, N ^o 13 of 1986	Establishes the procedure to be followed by the competent authorities for the acquisition of land for public purpose.	It includes, among other matters: investigations for selecting land to be carried out by a district officer appointed by the Minister; issue of notice of intended acquisition indicating the compensation to be paid for any damage caused during investigations; issue of notice of acquisition of land or servitude for a public purpose.	Department of Valuation
Monuments and Archaeological Sites and remains Act, 1958. Act N ^o 24 of 1958 Antiques Ordinance, 1960	An Act to provide for the preservation of ancient and historical monuments and archaeological sites and remains of national importance	For the regulation of archaeological excavations and for the protection of sculptures, carvings and other like objects etc.	Department of Archaeology

Name	Scope and Objectives	Key Areas	Operational Agencies / Key Players
Motor Traffic Act N° 60 of 1979	To provide sustainable approach for vehicle traffic	Regulates vehicle traffic during transportation of construction materials and the construction activities	
National Environmental Act N° 47 of 1980, amendment N° 56 of 1988, and other amendments	Provide protection, management, enhancement of the environment with prevention and control of pollution	Regulates sustainable utilisation of almost all natural resources such as water, soil and air	Central Environmental Authority (CEA)
National Environmental (Protection & Quality) Regulations, No 01 1990.	To provide for the prevention and control of water pollution and enhancing the quality of water	Controls sewage and effluents into inland surface water	CEA
National Environmental (Ambient Air Quality) Regulations, 1994.	To provide for the prevention and control of air pollution	Controls emissions of air pollutants	CEA
National Environmental (Noise Control) Regulations N°1 1996	To provide maximum allowable noise levels	Regulates noise pollution	CEA
National Involuntary Resettlement Policy	Land Acquisition Act does not deal with the broader social and economic impacts of the project. Thus, this policy was established to overcome these impacts.	To monitor land replacement, income restoration, relocation assistance and allowances, consultation and grievance redress, assistance to vulnerable groups and provision of resettlement sites and services.	Government of Sri Lanka / Land Acquisition and Resettlement Committee (LARC)
Public Utilities Commission of Sri Lanka Act , N° 35 of 2002	Create an environment for all inhabitants of Sri Lanka and the contributors to its development, to have access to essential infrastructure and utility services in the most economical manner within the boundaries of the sustainable development agenda	Regulate all the utilities within the purview of the Public Utilities Commission of Sri Lanka, to ensure safe, reliable and reasonably priced infrastructure services for existing as well as future consumers in the most equitable and sustainable manner.	The Public Utilities Commission of Sri Lanka
Soil Conservation (Amendment) Act N° 24 of 1996	Act for conservation of soil resources and productive capacity of land	Degraded Land, prevent damage against salinity, water logging, drought, floods	Soil Conservation Board
Sri Lanka sustainable energy Authority Act, N° 35 of 2007	To develop renewable energy resources; to declare energy development areas; to implement energy efficiency measures and conservation programmes; to promote energy security	Reliability and cost effectiveness in energy delivery and information management, function as a National Technical Service Agency of Clean Development Mechanism (CDM) in Sri Lanka that provides technical assistance to the Designated National Agency for Clean Development Mechanism and project developers, on energy sector clean development project activities	Sri Lanka Sustainable Energy Authority

ASSESSMENT OF LEGAL AND INSTITUTIONAL FRAMEWORK

Sri Lankan Environmental Legislation

The requirement for Environmental Assessment in Sri Lanka is established by the National Environment Act No. 47 (1980), and the amendment to the act 1988, Act No. 56 Section 23A, for EPL procedure and the EIA regulation under Part 4C, under the provision of section 23Z. The

procedures are defined in the environmental impact assessment (EIA) Regulations Gazette No. 772/22 (1993). The Prescribed Projects set out in the Gazette Extra Ordinary No. 772/22 of 24th June 1993, No: 1104/22 dated 6th November 1999, and No: 1108/1 dated 29th November 1999 for which environmental assessment is mandatory, and described as below:

Part I: Projects and undertakings if located wholly or partly outside the coastal zone as defined by Coast Conservation Act No. 57 of 1981.

- Reclamation of Land, wetland area exceeding 4 hectares.
- Extraction of timber covering land area exceeding 5 hectares
- Conversion of forests covering an area exceeding 1 hectare into non-forest uses.
- Clearing of land areas exceeding 50 hectares.
- Installation of overhead transmission lines of length exceeding 10 kilometers and voltage above 50 Kilovolts
- All renewable energy based electricity generating stations exceeding 50 Megawatts
- Involuntary resettlement exceeding 100 families other than resettlement effected under emergency situations.
- Development of all Industrial Estates and Parks exceeding an area of 10 hectares

PART III: All projects and undertaking listed in Part I above irrespective of their magnitudes and irrespective of whether they are located in the coastal zone or not, if located wholly or partly within the areas specified in part III of the Schedule.

1. Within 100 m from the boundaries of or within any area declared under
 - i. the National Heritage Wilderness Act No. 3 of 1988;
 - ii. the Forest Ordinance (Chapter 451);whether or not such areas are wholly or partly within the Coastal Zone as defined in the Coast Conservation Act, No. 57 of 1981
2. Within the following areas whether or not the areas are wholly or partly within the Coastal zone:
 - iii. any erodable area declared under the Soil Conservation Act (Chapter 450)
 - iv. any flood area declared under the Flood Protection Ordinance (Chapter 449) and any flood protection area declared under the Sri Lanka Land Reclamation and Development Corporation Act, 15 of 1968 as amended by Act, No. 52 of 1982.
 - v. 60 meters from the bank of a public stream as defined in the Crown Lands Ordinance (Chapter 454) and having a width of more than 25 meters at any point of its course.
 - vi. any reservation beyond the full supply level of a reservoir.
 - vii. any archaeological reserve, ancient or protected monument as defined or declared under the Antiquities Ordinance (Chapter 188).
 - viii. any area declared under the Botanic Gardens Ordinance (Chapter 446).
 - ix. within 100 meters from the boundaries of, or within, any area declared as a Sanctuary under the Fauna and Flora Protection Ordinance (Chapter 469).
 - x. within 100 meters from the high flood level contour of, or within, a public lake as defined in the Crown Lands Ordinance (Chapter 454) including those declared under section 71 of the said Ordinance.
 - xi. Areas declared under the Urban Development Authority Act No 41 of 1978 and Act No. 4 of 1982 section 29 (this indicates in its definition that laws are valid to the areas of the Local authorities).

The requirement for EIA and the level of study required are determined by the Central Environment Authority (CEA) after submission by the proponent of a Project Information Document (PID), plus supporting information, if relevant. There are two possible outcomes:

Categorical Exclusion: The activity is not on the list of prescribed projects in the EIA regulations, is not in or near a sensitive area, has not been the subject of public protest, and it is clear from the PID and supporting information that the project will have no significant environmental impacts. Environmental clearance is granted (with or without conditions) and the project may proceed.

Environmental Assessment: All other projects require Environmental Assessment and the CEA establishes a Scoping Committee to decide on the level of study (IEE or EIA) and prepare Terms of Reference (ToR). Alternatively, if the project lies wholly within the jurisdiction of a single government agency, only if it is a gazetted PAA agency. CEA may refer the project to this authority (as the Project Approving Agency) to administer the EIA process. A Technical Review Committee (TRC) reviews the completed IEE or EIA report and recommends whether environmental approval shall be granted; the final decision is made by CEA.

There are further compliance requirements prescribed by other certain legislation, in particular the Coast Conservation Act, which requires clearance by the Coast Conservation Department (CCD) for any development activity or structure in the coastal zone¹⁵. An Environmental Protection License (EPL) from CEA, is required for the operation of the completed facilities (A list has been published by CEA).

No development or encroachment of any kind is permitted in archaeological reserves declared under the Antiquities Ordinance No. 9 of 1940 as amended (Section 34). The Director General of Archaeology is empowered to conduct an Archaeological Impact Assessment of areas that may be affected by development or other projects proposed by the government or any person.

No construction activities are permitted in national reserves (under the jurisdiction of the Department of Wildlife Conservation - the Fauna and Flora Protection Ordinance No. 2 of 1937, as amended) and forest reserves (under the jurisdiction of the Forest Department - see the Forest Ordinance of 1907 as amended). Sanctuaries, also declared under the Fauna and Flora Protection Ordinance, may include privately-held land. Clearance from the Department of Wildlife Conservation is required if construction is proposed in sanctuaries. Construction within 1 mile (1.6 km) radius of a national reserve, sanctuary or buffer zone needs permission from the Department of Wildlife Conservation (see the Fauna and Flora Protection Ordinance No. 2 of 1937, as amended). Any development activity within a fishery reserve¹⁶ requires the permission and approval of the Director of Fisheries and Aquatic Resources (see the Fisheries and Aquatic Resources Act No. 2 of 1996). Any construction taking place in close proximity to a forest reserve must be approved and cleared by the Forest Department.

Using paddy land for a purpose other than agricultural cultivation without the written permission of the Commissioner General is a punishable offence under the Agrarian Development Act No. 46 of 2000 (Section 32). In addition to environmental clearance, approval from the local authorities and CEA for site clearance; and consent from all relevant *Pradeshiya Sabhas*, Provincial Councils, and Divisional Secretaries shall be obtained before construction begins.

Clearance shall be obtained for the proposed development activities, if the area is declared under the UDA Act or Sri Lanka Land Reclamation and Development Corporation (SLLR and DC) Act.

A summary of Government environmental compliance requirements applicable to the project is presented in **Table 1**.

¹⁵ The coastal zone is defined in the Coast Conservation Act No. 57 of 1981 "as the area lying within a limit of 300 meters landward from mean high water line (MHWL). In the case of rivers, streams, lagoons or any other body of water connected to the sea, either permanently or periodically, the landward boundary extends to a limit of 2 km measured perpendicular to the straight base line drawn between the natural entrance points thereof and includes waters of such rivers, streams and lagoons or any other body of water so connected to the sea."

¹⁶ Certain areas adjoining earmarked reservoirs and water bodies can be declared as a fishery reserve with the concurrence of the Ministry of Wildlife and Natural Resources.

Table 1: Summary of Environmental Compliance Requirements of the Project Components for EARF Consideration

	Subproject	Subcomponent	Applicable Legislation	Statutory Requirement	Authorizing Body
1.	New Transmission lines, Distribution lines, substations	All subcomponents in sensitive areas	National Environment Act (NEA)	Environmental Clearance (EC)	Central Environment Authority (CEA)
		All subcomponents falling within the coastal zone	Coast Conservation Act	Clearance	Coastal Conservation Department (CCD)
		All subcomponents that require site clearance	Municipal Councils Ordinance No. 29 of 1947, the Urban Councils Ordinance No. 61 of 1939 and the <i>Pradeshiya Sabha</i> Act No. 15 of 1987 as amended	Clearance	Municipal Councils, Urban Councils and <i>Pradeshiya Sabhas</i>
		All subcomponents that require cutting of trees	Felling of Trees (Control) Act No 9 of 1951	Tree-cutting Permit	Forest Department
		All subcomponents within a 1 mile (1.6 km) radius of a national reserve, sanctuary, or buffer zone	Fauna and Flora Protection Ordinance No. 2 of 1937 as amended	Clearance	Department of Wildlife Conservation
		All subcomponents in close proximity of a reserve forest	Forests Ordinance No. 16 of 1907 as amended	Clearance	Forest Department
		All subcomponents in and around fishery reserves	Fisheries and Aquatic Resources Act No. 2 of 1996	Clearance	Director of Fisheries and Aquatic Resources
		All subcomponent in proximity of archaeological reserves	Antiquities Ordinance No. 9 of 1940 as amended	Clearance	Department of Archaeology
		All subcomponent in and around irrigation development	Irrigation Development Act	Clearance	Director, Irrigation Department
		All subcomponent in and around archaeological reserves around UDA declared areas	UDA Act No. 41 1978 and No. 4 of 1982	Clearance	Regional Director UDA
2	Solar Park, Wind Farm	All subcomponents in sensitive areas	NEA	EC	CEA
		All subcomponents falling within the coastal zone	Coast Conservation Act	Clearance	CCD
		All subcomponents that require site clearance	Municipal Councils Ordinance No. 29 of 1947, the Urban Councils Ordinance No. 61 of 1939 and the <i>Pradeshiya Sabha</i> Act No. 15 of 1987 as amended	Clearance	Municipal Councils, Urban Councils and <i>Pradeshiya Sabhas</i>
		All subcomponents that require cutting of trees	Felling of Trees (Control) Act No. 9 of 1951	Tree-cutting Permit	Forest Department
		All subcomponents within a 1 mile (1.6 km) radius of a national reserve, sanctuary, or buffer zone	Fauna and Flora Protection Ordinance No. 2 of 1937 as amended	Clearance	Department of Wildlife Conservation
		All subcomponents in close proximity of a reserve forest	Forests Ordinance No. 16 of 1907 as amended	Clearance	Forest Department
		All subcomponents in and around fishery reserves	Fisheries and Aquatic Resources Act No. 2 of 1996	Clearance	Director of Fisheries and Aquatic Resources
		All subcomponent in proximity of archaeological reserves	Antiquities Ordinance No. 9 of 1940 as amended	Clearance	Department of Archaeology
		All subcomponents in and around fishery reserves	Fisheries and Aquatic Resources Act No. 2 of 1996	Clearance	Director of Fisheries and Aquatic Resources
		All subcomponent in proximity of archaeological reserves	Antiquities Ordinance No. 9 of 1940 as amended	Clearance	Department of Archaeology

CCD= Coastal Conservation Department, CEA = Central Environment Authority, EC = Environmental Clearance, NEA = National Environment Act, UDA = Urban Development Authority.

Table 2 summarizes the application procedures for the main environmental permits.

Table 2: Summary of Procedure for Obtaining Environmental Permits Required by the Government of Sri Lanka

Legislation	Regulatory, Agency	Summary of Procedure	Time scale
1. Central Environmental Authority - Environment Impact Assessment/Initial Environmental Examination (IEE/EIA) Clearance			
National Environmental Act No. 47 of 1980 and amended Act No. 56 of 1988; Government Gazette No. 772/22 of 24th June 1993 and No. 859/14 of 23rd February	Central Environmental Authority (CEA)	1. Proponent to submit Project Information Document to CEA	During Feasibility Stage
		2. CEA to designate Project Approving Authority (PAA)	36 days

Legislation	Regulatory, Agency	Summary of Procedure	Time scale
1995		3. PAA to appoint scoping committee; Issue of Terms of Reference (ToR) for the EIA/IEE	
		4. Proponent to conduct the environmental assessment and submit report to PAA	One and half years
		5. PAA to check adequacy	14 days
		6. For EIA, report will be open for public comments	30 days
		7. Technical Review Committee (TRC) to review report and forwarding comments	36 days
		8. PAA to recommend to CEA issuance of Clearance	
2. Coast Conservation Department Permit			
Under Section 5, 14, 15 and 16 of Coast Conservation Act No. 57 of 1981	Coast Conservation Department (CCD)	1. Proponent to submit application to CCD	During Feasibility Stage
		2. CCD to issue ToR for EIA/IEE	
		3. Proponent to conduct the environmental assessment and submit report to CCD	One and half years
		4. For EIA, CCD will (i) invite Coast Conservation Advisory Council for comments; and (ii) open report for public comments	120 days (maximum)
		5. CCD to review comments	
		6. CCD to issue permit	
3. Environmental Protection License (EPL)			
National Environmental Act No. 47 of 1980 amended by Acts No. 56 of 1988 and No. 53 of 2000; Gazette Notification No. 1533/16 dated 25.01.2008	CEA	1. Proponent to submit application to CEA	Minimum of 30 days prior to the commencement of operation
		2. CEA to conduct field inspection and verification from relevant authorities	
		CEA to prepare Inspection Report with Recommendations	14 days
		TRC to review report	
		Proponent to pay license fee	
CEA to issue EPL			
4. Archaeological Impact Assessment Survey			
Under Section 47 read with Section 43(b) of Antiquities (Amendment) Act No. 24 of 1998; Gazette Notification No. 1152/14 dated 04.10.2000	Department of Archaeology	Proponent to submit application to Department of Archaeology.	During Feasibility Stage
		DA Regional Office to conduct Preliminary Observation and submit report to Department of Archaeology.	About 30 days
		(i) If there are no antiquities according to the recommendation and observation report, land will be released for the project.	30 days
		(ii) If the preliminary observation report has proposed to carry out an archaeological impact assessment survey, steps will be taken to conduct the survey including scoping with other agencies.	
		Department of Archaeology to call for quotations and award contract for Archaeological Impact Assessment (AIA) survey	
		Selected agency to conduct AIA survey and submit report to Department of Archaeology	42 days
		Department of Archaeology to submit AIA report to Minister in charge of approval	About 30 days
Department of Archaeology to issue approval			
5. Clearance from Department of Forest Conservation			
Under the ordinance enacted in 1907 No. 16, and subsequent amendment No. 23, 1995 and No. 65 of 2009.	Department of Forest Conservation (DFC)	Proponent to submit application to DFC	During Feasibility Stage
		District Forest Office along with the DFC officials to conduct preliminary observation and submit report to Conservator General of DFC for approval	About 60 days
		(i) If the project is located within the core protected area, the application will be rejected;	60 days
		If the project will utilize resources from the forest (timber or related) the application will be rejected (even if it is located outside the boundary and the buffer);	
		If the project is outside the boundaries and buffers of any Forest Reserves (FRs), DFC's consent will be released.	

Legislation	Regulatory, Agency	Summary of Procedure	Time scale
		DFC will refer to CEA if the proposed activities will cause negative impacts on forest conservation areas and there will be extraction of resources involved.	30 days
		- Under NEA, EIA will be conducted - DFC will become the project approving agency	116 days
		DFC will release the approval with the concurrence of the CEA.	

Notes: CEA = Central Environmental Authority, PAA = Project Approving Agency, CCD = Coast Conservation Department, ToR = Terms of Reference, EPL = Environment Protection License, EIA = Environmental Impact Assessment, IEE = Initial Environmental Examination, DA = Department of Archaeology, AIA = Archaeological Impact Assessment, UDA = Urban Development Authority, SLLR&DC = Sri Lanka Land Reclamation and Development Corporation, DFC = Department of Forest Conservation.

APPLICABLE INTERNATIONAL ENVIRONMENTAL AGREEMENTS

In addition to national rules and regulations, international conventions such as the International Union for Conservation of Nature and Natural Resources (IUCN), Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Convention on Migratory Species of Wild Animals (CMS) and Ramsar Convention on Wetlands of International Importance are applicable for selection and screening of subprojects under restricted/sensitive areas. Sri Lanka is a party to these conventions.

A. International Union for Conservation of Nature and Natural Resources (IUCN). The IUCN Red List of Threatened Species (also known as the IUCN Red List or Red Data List), founded in 1963, is a comprehensive inventory of the global conservation status of plant and animal species. The IUCN is an authority on the conservation status of species. A series of Regional Red Lists are produced by countries or organizations, which assess the risk of extinction to species within a political management unit. The IUCN Red List is set upon precise criteria to evaluate the extinction risk of thousands of species and subspecies. These criteria are relevant to all species and all regions of the world. The aim is to convey the urgency of conservation issues to the public and policy makers, as well as help the international community to try to reduce species extinction.

B. Convention on Migratory Species of Wild Animals (CMS). CMS adopted in 1979 and entered into force on 1 November 1983. CMS, also known as the Bonn Convention, recognizes that local authorities must be the protectors of migratory species that live within or pass through their national jurisdictions, and aims to conserve terrestrial, marine, and avian migratory species throughout their ranges. Migratory species threatened with extinction are listed on Appendix I of the Convention. CMS parties strive towards strictly protecting these species, conserving or restoring the places where they live, mitigating obstacles to migration and controlling other factors that might endanger them. Migratory species that need or would significantly benefit from international cooperation are listed in Appendix II of the Convention, and CMS encourages the range states to conclude global or regional agreements.

C. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). It is an international agreement between governments. Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES was first formed, in the 1960s. Annually, international wildlife trade is estimated to be worth billions of dollars and includes millions of plant and animal specimens. The trade is diverse, ranging from live animals and plants to a vast array of wildlife products derived from them, including food products, exotic leather goods, wooden musical instruments, timber, tourist curios and medicines. Levels of exploitation of some animal and plant species are high and the trade in them, together with other factors, such as habitat loss, is capable of heavily depleting their populations and even bringing some species close to extinction. Many wildlife species in trade are not endangered, but the existence of an agreement to ensure the sustainability of the trade is important in order to safeguard these resources for the future. Because the trade in wild animals and plants crosses borders between countries, the effort to regulate it requires international cooperation to safeguard certain species from over-exploitation.

D. Ramsar Convention on Wetlands of International Importance 1971. The Convention on Wetlands of International Importance, called the Ramsar Convention, is an intergovernmental treaty that provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The Ramsar Convention is an international treaty for the conservation and sustainable utilization of wetlands. The Ramsar Convention is the only global environmental treaty that deals with a particular ecosystem. According to the Ramsar list of Wetlands of International Importance, there are five designated wetlands in Sri Lanka that need to be protected. Activities undertaken in the proximity of Ramsar wetlands shall follow the guidelines of the convention. Sri Lanka presently has 5 sites designated as Wetlands of International Importance, with a surface area of 32,372 hectares.

E. United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention. The most significant feature of the 1972 World Heritage Convention is that it links together in a single document the concepts of nature conservation and the preservation of cultural properties. The Convention recognizes the way in which people interact with nature, and the fundamental need to preserve the balance between the two. The convention defines the kind of natural or cultural sites, which can be considered for inscription on the World Heritage List. The convention sets out the duties of states parties in identifying potential sites and their role in protecting and preserving them. By signing the Convention, each country pledges to conserve not only the World Heritage sites situated on its territory, but also to protect its national heritage. The states parties are encouraged to integrate the protection of the cultural and natural heritage into regional planning programs, set up staff and services at their sites, undertake scientific and technical conservation research, and adopt measures, which give this heritage a function in the day-to-day life of the community. It also encourages states parties to strengthen the appreciation of the public for World Heritage properties and to enhance their protection through educational and information programs.

SYSTEM DESIGN STANDARDS FOLLOWED BY CEB FOR SETBACKS ETC.

Voltage definition

Reference to voltage levels are in accordance with the following values.

- Extra low voltage - normally not exceeding 30 volts.
- Low voltage - exceeding 30V, but not exceeding 650 to earth or 1kV between phases
- High voltage - exceeding 1kV, but not exceeding 33kV
- Extra high voltage - exceeding 33kV

System design parameters

Electrical design parameters

The following electrical design parameters have been adopted in the new construction standards.

System frequency	50 Hz			
<u>High voltage</u>	<u>11kV</u>	<u>33kV</u>	<u>132kV</u>	<u>220kV</u>
Nominal system voltage /kV	11	33	132	220
Maximum system voltage /kV	12	36	145	245
Lightening impulse withstand voltage /kV	75	170	800	1050
Wet one minute power frequency withstand voltage /kV	28	70	300	395
Minimum overall creepage distance /mm	254	699	3100	4800
<u>Low voltage</u>				
Nominal system voltage /V	400/230			
Maximum system voltage /V	440/254			
One minute test voltage /V	2000			
Impulse withstand voltage /V	6000			

Physical design parameters

The following physical design parameters have been adopted in the projected area.

- Climate - equatorial, intense sun shine, heavy rain and dust laden atmosphere.
- Annual average air temperature - 27°C
- Average annual rainfall - 2400 mm
- Relative humidity - 72 - 84 %
- Average annual Isokeraunic level - 80 days

Conductor and structure parameters

Conductor sag and tensions will be determined in accordance with the following parameters.

Maximum conductor tension determined at minimum temperature with maximum wind loading.

Maximum conductor sag determined at maximum wind with no wind.

Constant conductor tension occurs at defined normal everyday temperature. This is the assumed average temperature at which conductor string will occur.

LOADING AND TEMPERATURES

		Pole lines	Tower lines
ASSUMED WIND LOADING			
Wind Pressure on Conductors and Earthwires	N/m ²	0.8 575	1.34 970
Wind Pressure on Insulators	N/m ²	1.2 865	1.41 1170
Wind Pressure on Lattice Steel Supports	N/m ²	1.5 1370	2.25 1640

ASSUMED TEMPERATURES OF CONDUCTORS & EARTHWIRES		Pole lines	Tower lines
Minimum Temperature	oC	15	7
Everyday Temperature	oC	32	32
Minimum Temperature	oC	65	75

MINIMUM FACTORS OF SAFETY

Conductors and Earthwires at Maximum Working Tension based on Ultimate Strength	2.5
Conductors and Earthwires at Everyday Temperature still Air Tension, based on Ultimate Strength	4.5
Anchor Clamps and Mid-span Joints, based on Ultimate Strength of Conductor and Earthwire	0.95
Insulator Strings and Fittings at Maximum Working Tension based on Failing Load	3.0
Straight Line Supports and Foundations under Normal Working Loads	2.0
Angle, Section and Terminal Supports and Foundations under Normal Working Loads	2.5
Towers under Broken Wire Loads	1.25
Foundations under Broken Wire Loads	1.5

Clearance from ground and structures

Overhead line conductors shall have the following minimum clearances :

a) above ground

	33kV	11kV	Low voltage
across a public road	6.4m	6.1m	5.5m
any other positions	6.1m	5.2m	5.0m
in any other place inaccessible to vehicles	4.9m	4.6m	4.6m

flying guy wires- across any road or street 5.5m

b) from buildings, other structures, and trees

	33kV	11kV	Low voltage
vertical clearance	3.0m	2.7m	2.4m
horizontal clearance	2.0m	1.5m	1.5m

c) Clearances from Railway Lines

	33kV	11kV	Low voltage
minimum clearances from rail.	7.0m	6.7m	6.7m

No pole or support shall be erected nearer than 3.1m on sidings, and 4.0m in all other cases, from the centre of the nearest railway track to the near face of the pole or support. The pole at each side of the crossing span shall be imbedded in concrete with a minimum depth of 300mm below ground level and a minimum radial thickness of 600mm. The span crossing the railway line shall not exceed 50m, and no joints shall be made in the crossing span, nor in the full span on each side. Double crossarms fitted with insulators shall be erected on the poles at each side of the crossing span.

d) Clearances form Other Conductors

Overhead line conductors shall have the following clearances from other conductors:

a) between other overhead conductors

	LV	11kV	33kV
<u>low voltage</u>			
- vertical clearance	0.6m	1.2m	1.5m
- horizontal clearance	0.3m	1.2m	1.5m
<u>11kV</u>			
- vertical clearance		0.6m	1.2m
- horizontal clearance		0.7m	0.9m
<u>33kV</u>			
- vertical clearance			1.0m
- horizontal clearance			0.9m

NB : lines of a lower voltage shall not be carried above lines of a higher voltage.

b) from telephone lines

33kV	11kV	bare low voltage	low voltage insulated
1.8m	1.8m	1.2m	0.6m

c) phase to earth clearances

i) 33kV	0.32m
ii) 11kV	0.12m

Safety Clearances - In the interests of personnel safety, safe working clearances shall be as follows:

33kV	11kV	bare low voltage (except neutral)
610mm	300mm	150mm

Operators of any mechanical equipment such as diggers, cranes etc., or drivers of vehicles with high loads etc. Shall be required to maintain a minimum safety distance of 3.5m between their plant and any conductor of any live overhead line. In special circumstances where approval is given in writing this could be reduced to the following minimum distances:

33kV	11kV	bare low voltage
2.0m	1.5m	1.0m

Construction of building, structures, scaffolding or similar shall be limited to a safety distance no closer than 4m from any overhead line.

Tower line		220 kV	132 kV
Minimum Clearance from Conductor: To Ground	m	7.01	6.71
Metal Clad or Roofed Buildings, or other Buildings or Structures upon which a man may stand	m	4.65	4.10
To earthed cradle Guard Wires	m	3.96	3.96
To Electric power Line Wires (Line to Earth)	m	4.57	3.66
To be added to the above Clearance to Allow for Conductor Creep (at Mid Span)	m	0.30	0.30
Minimum horizontal spacing between outermost conductor of adjacent power line in still air	m	15.3	15.3
Spacing between P + T Line and cradle guard	m	1.83	1.83
Minimum clearance from live metal to earth metal	m	2.2	1.65

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 CEYLON ELECTRICITY BOARD
 14 OCT 1993
 Clearing Right of Way
 (Wayleaves Clearances) BRANCH.

My No : AGM/PLX/10/1



Addl. G.M. (D & C S) has requested our recommendation regarding the width of clearance for Right of Way purposes for 220 kV lines.

The past practice in the CEB has been to maintain the following clearances on each side of the transmission line :

- 220 kV - 100 ft.
- 132 kV - 60 ft.

I recommend the following widths of right of way for long span transmission lines.

Transmission Voltage kV	Recommended width of Right - of - way M
66	18
132	27
220	35

All Project Managers
 f.i. M.
 15/10

In addition to this, when constructing a 220 kV transmission line, the person who executes the work should use his discretion and clear any tree outside the track which could fall on to the transmission line. The values given above have been determined after taking into consideration the height of the transmission tower, maximum sag of the conductor and the minimum electrical clearance to earthed objects. They are same as those given in Indian Standard : 5613 (Part 11/Sec 2) - 1976 (code of Practice for Design, Installation and Maintenance of Overhead Power Lines)

Addl. General Manager (Planning)



Office of the AGM (Pl.)
 C.E.B., Colombo 2.
 06th Oct., 1993.

Copy to :- Addl.G.M. (D & C S) - Ref. your letter No. AGM(D&CS) /Tech. dated 08th Sept.1993.

LINE CLEARANCES

Description of Clearance	Minimum Clearance (meters)	
	132 kV	220 kV
Minimum ground clearance at any point not over roads	6.7	7.0
Line conductor to road surface	6.7	7.4
Line conductor to high load route surface	7.5	8.5
Line conductors to railway crossings	8.0	8.2
To Cradle guards	4.0	4.0
To road surface where cradle guards can be used (Note 1)	8.8	9.8
Where power lines cross or are in close proximity (Note 2)	2.7	3.7
To any object on which a person may stand including ladders, access platforms etc. (Note 3)	3.6	4.6
To any object to which access is not required and on which a person cannot stand or lean a ladder (Note 3)	1.4	2.4
Support of upper line and any conductor of lower line	15.0	15.0
Survey and sagging error (Note 4)	0.3	0.3
To trees adjacent to line		
(i) Unable to support ladders/ climber	1.4	2.4
(ii) Capable of supporting ladder/ climber	3.6	4.6
(iii) Trees falling towards line with line conductors hanging vertically only	1.4	2.4

Note

1 These clearances are possible for situations where sky cradle can be used for conductor erection and maintenance. These clearances allow for the positioning of Sky cradle and erection of temporary scaffoldings under a live circuit.

2 Clearances shall be defined in a way that the upper conductor at its maximum temperature and coincides with the lower conductor, which at its minimum temperature and deflected by an angle of 450degrees.

3 Clearances shall be defined with the conductor at its specified maximum temperature and deflected by any angle up to 450 degrees.

4 To account for minor variations in ground topography and foundation installation, the transmission line profile shall be plotted with an additional clearance of 0.3m over those specified in the above table.

Annexure 2 Route Analysis for 33 kV lines

SN o.	Description	C.II. 33 kV distribution line Vavunathivuv GSS to Thalankuda (18.35 km)	C.III-IV 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	C.V-VI. 33 kV distribution line Vavunathivuv GSS to Urani (6.9 km)	C.VII-VIII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (12.4 km)	C.IX-X. 33 kV distribution line Madampe GSS to Bowatte (20 km)	C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry
1.	Length of line	18.35 km	24.35 km	6.9 km	12.4 km	42 km	Existing Line
2.	Canal / River crossings	Yes Perukkilasyar Aru at AP1-AP2, Pathanthoddathne at AP2-AP3,& Manalputty Aru at AP4-T1	Yes Perukkilasyar Aru at AP1-AP2, Pathanthoddathne at AP2-AP3,& Manalputty Aru at AP4-T1	None	None	(AP23-AP24), (AP21-AP22), (AP20B-AP21), (AP20A-P20B), (AP19-AP20A), (AP17-AP19), (AP13-AP14), (AP12-AP13), (AP11-AP12), (AP10-AP11), (AP6-AP7),	
3.	(i) Forest Area (in Hectare) (ii) Wild life Sanctuary/National Park (in Hectare) (iii) Distance from nearest Wildlife sanctuary/ National Park	Not applicable	Not applicable	(i) 0.06 ha	Not applicable	None	
4.	Development of Tower site - Number of towers - Land to be acquired for tower base	67 268 m ²	84 336 m ²	25 100 m ²	44 176 m ²	76 304 m ²	
5.	Land Strata	05 Paddy land, Home garden, Mash, Water bodies & Urban area	05 Paddy land, Home garden, Mash, urban area & Water bodies	04 (Paddy, Forest, Home garden & Mash)	02 paddy land & home garden	05 (Home garden, paddy land, plantation, marsh, water bodies)	
6.	Road accessibility	A004,B018 & B344	A004, B018 & B344	A004 and Batticaloa-Vavunativu road	A5, Karadiyanaru-Vavunativu & Karadiyanaru- Kalkudah	A003, B079 & B247	
7.	Private land (in ha.) (i) Agriculture:- a) Irrigated b) Non-irrigated (ii) Non-Agriculture / Private Waste land. (iii) House or Building: a) Residential b) Non-Residential	1.50 ha in Mash land, 12.3 ha in Paddy land, 0.75 ha in semi urban area & 2.00 ha in water bodies	16.87 ha in Paddy land,. 1.42 ha in Uncultivated	3.25 ha (non irrigated paddy lands) 0.20 ha home garden 0.80 ha uncultivated	Agriculture 7.25 Home garden 2.80 Non Agriculture 1.05 Home garden 0.1	Agriculture 12.50 ha Non irrigated agriculture 1.25 ha None agriculture 3.75 ha, Home garden 3.85 ha	
8.	EHV Line Crossing	None	None	None	None	Yes (AP19-AP20A), (AP22-AP23), (AP30-Madampe GSS)	

SN o.	Description	C.I-II. 33 kV distribution line Vavunathivuv GSS to Thalankuda (18.35 km)	C.III-IV 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	C.V-VI. 33 kV distribution line Vavunathivuv GSS to Urani (6.9 km)	C.VII-VIII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (12.4 km)	C.IX-X. 33 kV distribution line Madampe GSS to Bowatte (20 km)	C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry
9.	HT line crossings	Yes (GSS-P1), (TAP3-TAP4) & (TAP4-Gantry)	Yes (GSS-P1), (TSAP1-AP5) & (AP8-Gantry)	Vavunativu GSS-AP1) & (Urani Gantry –AP5)	Yes, AP2-Gantry	Yes (AP27-AP28), (AP22-AP23), (AP20B-AP21), (AP19-AP20A), (AP18-AP19), (AP14-AP16), (Bowatta GS-AP01)	
10.	No. of Forest Trees :- a) Trees to be felled b) Trees to be lopped	None	None	None	None	a 65 b 19	
11.	No. of private trees (i) Fruit Trees: a) Trees to be felled b) Trees to be lopped (ii) Non-Fruit Trees: a) Trees to be felled b) Trees to be lopped	a (i) 11 b 3 (ii) 110 11	a (i) 18 b 04 (ii) 125 10	a (i) 9 b 2 (ii) 128 5	a (i) 30 b 17 (ii) 131 7	a (i) 173 b 22 (ii) 52 20	
12.	Length of line in mountainous area	None	None	None	None	None	
13.	Length of line in coastal area	None	None	None	None	None	
14.	Length of line in cultivated area	13.05 km (home gardens & agricultural lands)	16.87 km	3.45 km (home gardens & agricultural lands)	10.05 km (home gardens & agricultural lands)	17.60 km (home gardens & agricultural lands)	
15.	Length of line in un-cultivated area	1.60 km	1.42 km	0.80 km	1.05 km	0.70 km	
16.	Highest altitude en-route the line	2.5 m	2.5 m	2.5 m	2.5 m	20 m	
17.	Nearest distance from airport	295 km			2.50 km from Vavunativu GSS & 15.5 km from Karadiyanaru gantry		
18.	Distance from nearest religious or archaeological sites	0.04 km from Kovil in Kottiyapalai & 0.03 km from Kovil in Manmunai	0.03 km from Kovil in Palugamam, 0.03 km from Kovil in Urasery	50 m from Kovil	75 m to Nellur Kali Kali Kovil	0.03 km Hadabandaragama Dewala/ tempal	
19.	Name of villages involved/Name of District	Kannankudah, Mandapattadi, Karayakkantive & Kottiyapulai illupalyadichenai Tavelamunai, Manaipiddy Arasaditivu Padaiyandaveli Mahiladitivu Periyativu, Manmunai & Thalancuda	Kannankudah, Mandapattadi, Karayakkantive & Kottiyapulai Illupalyadichenai Tavelamunai Manaipiddy Pddippalai, Arasaditivu Kadukkimmunai, Palugamam ipalanandapuram Paddapuram,	Thirupperunthurai, Eachchantheevu, Navatkaadu, Mankikaddu & Vavunativu Batticaloa District	Vavunativu, Palakkadu, lththiyadimadu, Ayittiyamalai Narippulthottam & Karadiyanaru	Bowatta, Kaduruwawa, Galisapitiya, Suduwella, Hedabandaragama, Galmuruwa, Kochakaduwa, Watuwatta Puttalam and Kurunegala District	

SN o.	Description	C.I-II. 33 kV distribution line Vavunathivuv GSS to Thalankuda (18.35 km)	C.III-IV 33 kV distribution line Vavunathivuv GSS to Kaluwanchikudy (27 km)	C.V-VI. 33 kV distribution line Vavunathivuv GSS to Urani (6.9 km)	C.VII-VIII. 33 kV distribution line Vavunathivuv GSS to Karadiyanaru (12.4 km)	C.IX-X. 33 kV distribution line Madampe GSS to Bowatte (20 km)	C.XI. 33 kV Lynx D/C Pole line conversion from Wellampitiya to Ambathale Gantry
		Batticaloa District	Munaitivu & Periyaporativu/ Batticaloa District				
20.	Land to be permanently acquired: a) Area (in ha) b) Cost.	None	None	None	None	None	None

Annexure 3 Locational Analysis for Gantry based Switching stations

S No	Description	C.II. 33 kV Thalankuda Gantry	C.IV 33 kV Kaluwanchikudy Gantry	C.VI. 33 kV Urani Gantry	C.VIII. 33 kV Karadiyanaru Gantry	C.X. 33 kV Bowatte Gantry
1	Land Details					
1.1.a	Area of land	7 Perch	10 perch	10 perch	10 perch	0.03 ha
1.b	Slope/Plain Land	Plat terrain	Plat terrain	Plat terrain	Plat terrain	Flat terrain
1.c	Approximate Amount of land cutting required	Not required	Not required	Not required	Not required	Not required
2.	Owner Ship of land (Private / Forest/ Other Govt. Department/ Other)	Govt.	Government	Govt	Government	Government
3.	Private land (in ha.)	Not Applicable	Not applicable	Not applicable	Not applicable	Not applicable
	(i) Agriculture :- a) Irrigated b) Non – irrigated					
	(ii) Non - Agriculture/ Private Waste land / barren.					
	(iii) House or Building: c) Residential d) Non – Residential					
4.	Distance from Nearest (With name)					
4.a	River (Name/Distance)	0.75 km to Lagoon	1.00 km to Lagoon	05 km to Lagoon	3.10 km to Mawalai Aru	8.5 km to Deduru oya
4.b	Highway	A4	A4 & B344	A4	A5	Chilaw-Wariyapola, B 79
4.c	Forest Area	None	None	None	None	None
4.d	Village / town	Thalancuda	Kaluwanchikudy	Urani	Karadiyanaru	Bowatte junction
4.e	Market/Area of Economic Activity	Barren land	Barren land	Fishing	Paddy cultivation	Stream reservation
5.	Road accessibility	A4	A4 & B344	A4	A5	B79, Wariyapola road
6.	EHV Line Passing Near By (Distance)	None	None	None	None	None
7.	HT line Passing Near By	Yes 0.25 km from proposed Gantry	Yes 0.10 km from proposed Gantry	Yes 0.02 km from proposed Gantry	Yes 0.07 km from proposed Gantry	None
8.	No. of Forest Trees :- c) Trees to be felled d) Trees to be lopped	None	None	None	None	None
9.	No. of private trees	None	none	none	None	
	(iii) Fruit Trees: c) Trees to be felled d) Trees to be lopped		None	None	None	None
	(iv) Non - Fruit Trees: c) Trees to be felled d) Trees to be lopped	None	None	None	None	None
10.	Distance from mountainous area	Not applicable	Not applicable	Not applicable	Not applicable	20 km to the coast
11.	Distance from in cultivated area	0.50 km	1.00 km	0.10 km	0.10 km	50 m, paddy
12.	Altitude of Gantry	2.5 m	2.5 m	2.5 m	2.5 m	28 m

S No	Description	C.II. 33 kV Thalankuda Gantry	C.IV 33 kV Kaluwanchikudy Gantry	C.VI. 33 kV Urani Gantry	C.VIII. 33 kV Karadiyanaru Gantry	C.X. 33 kV Bowatte Gantry
13.	Nearest distance from airport	10.10 km	25 km	2.75 km	15 km	50 km, Katunayaka
14.	Distance from nearest religious or archaeological sites	0.50 km kovil	0.05 km to kovil	0.10 km	0.10 km to kovil	5 km Sri Devagiri Rajamaha Viharaya

Annexure 4: Inventorisation along the Distribution Lines

C.I. 33 kV distribution line Vavunathivu GSS to Thalankuda (21 km)

SN ^o	Kilometre		Distance (km)	N ^o of Districts and Names	N ^o of villages and names	Ownership of Land (Private, Government, Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Number of trees under cutting/trimming	Types and N ^o of Trees
	From	To							
1	0.00	1.50	1.50	01 Batticaloa	01 Kannankudah	Government & Private	Agricultural	Palmyra	9
								Margosa	2
								Ficus	1
2	1.50	5.40	3.90	01 Batticaloa	04 Kannankudah, Mandapattadi, Karayakkantive & Kottiyapulai	Private	Agricultural		
4	5.40	6.40	1.00	01 Batticaloa	02 Kottiyapulai & illupalyadichenai	Private	Agricultural	Palmyra	23
								Margosa	03
								Kumbuk	01
								Ficus	01
5	6.40	9.90	3.50	01 Batticaloa	03 Kottiyapulai, illupalyadichenai & Tavelamunai	Private	Agricultural	Coconut	01
								Palmyra	41
								Ficus	01
6	9.90	11.30	1.40	01 Batticaloa	02 Tavelamunai & Manaipiddy	Private	Agricultural	Coconut	01
								Mango	01
								Palmyra	02
								Magosa	01
								Kubuk	01
7	11.30	12.55	1.25	01 Batticaloa	03 Manaipiddy, Arasaditivu & Padaiyandaveli	Private	Agricultural & home garden	Coconut	01
								Mango	01
								Palmyra	04
								Teak	01
8	12.55	14.85	2.30	01 Batticaloa	02 Padaiyandaveli & Mahiladitivu	Private	Agricultural	Mango	01
								Palmyra	09
								Margosa	01
								Ficus	02
9	14.85	15.85	1.00	01 Batticaloa	01 Mahiladitivu	Private	Agricultural	Mango	02
								Coconut	01
								Teak	01
10	15.85	18.35	2.50	01 Batticaloa	04 Mahiladitivu, Periyativu, Manmunai & Thalankuda		Agricultural & home garden	Mango	02
								Palmyra	05
								Ficus	01
								Margosa	01

C.III 33 kV distribution line Vavunathivu GSS to Kaluwanchikudy (27 km)

SI N ^o	Kilometre		Distance (km)	N ^o of Districts and Names	N ^o of villages and names	Ownership of Land (Private, Government Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
1	0.00	1.50	1.50	01 Batticaloa	01 Kannankudah	Private	Agricultural	Palmyra	09
								Margosa	02
								Ficus	01
2	1.50	5.40	3.90	01 Batticaloa	04 Kannankudah, Mandapattadi, Karayakkantive & Kottiyapulai	Private	Agricultural		
3	5.40	6.40	1.00	01 Batticaloa	02 Kottiyapulai & illupalyadichenai	Private	Agricultural	Palmyra	23
								Kumbuk	01
								Margosa	03
								Ficus	01
4	6.40	9.90	3.50	01 Batticaloa	03 Kottiyapulai, illupalyadichenai & Tavelamunai	Private	Agricultural	Coconut	01
								Palmyra	41
								Ficus	01
5	9.90	11.30	1.40	01 Batticaloa	02 Tavelamunai & Manaipiddy	Private	Agricultural	Coconut	01
								Mango	01
								Palmyra	02
								Margosa	01
								Kumbuk	01
6	11.30	18.50	7.20	01 Batticaloa	03 Pddippalai, Arsaditivu Kadukki munai, &	Private	Agricultural	Coconut	04
								Mango	03
								Palmyra	10

SI N°	Kilometre		Distance (km)	N° of Districts and Names	N° of villages and names	Ownership of Land (Private, Government Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
					Vipalanandapuram			Magosa	04
								Ficus	01
7	18.50	21.40	2.90	01 Batticaloa	03 Vipalanandapuram, Palugamam & Paddapuram	Private	Agricultural	Tamarind	01
								Palmyra	04
								Ficus	02
8	21.40	22.65	1.25	01 Batticaloa	03 Paddapuram, Munaitivu & Periyaporativu	Private	Agricultural	Coconut	01
								Mango	02
								Palmyra	09
								Margosa	02
								Ficus	01
9	22.65	23.60	0.95	01 Batticaloa	01 Periyaporativu	Private	Agricultural	Coconut	01
								Mango	02
								Palmyra	01
								Margosa	01
10	23.60	24.35	0.75	01 Batticaloa	01 Periyaporativu	Private & Government	Agricultural	Mango	01
								Palmyra	03
								Ficus	01

33 kV distribution line Vavunathivu GSS to Urani (6 km)

SN°	Kilometre		Distance (km)	N° of Districts and Names	N° of villages and names	Ownership of Land (Private, Government Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
1	0.00	2.15	2.15	01 Batticaloa	02 Vavunathivu & Mankkaddu	Govt. & Private	Agricultural	Mango	02
								Palmyra	10
								Margosa	02
								Manjona	02
2	2.15	2.65	0.50	01 Batticaloa	02 Mankkaddu & Navatkaadu	Private	Agricultural	Palmyra	06
								Margosa	1
								samala	1
								Manjona	2
3	2.65	3.40	0.75	01 Batticaloa	02 Navatkaadu & Eachchantheevu	Private	Agricultural & Home Garden	Coconut	1
								Mango	2
								Palmyra	8
								Margosa	1
								samala	2
								Manjona	1
4	3.40	4.50	1.10	01 Batticaloa	01 Eachchantheevu	Govt	Lagoon & marsh	Palmyra	36
								Margosa	1
								Palu	1
								Coconut	1
								Mango	3
5	4.50	5.60	1.10	01 Batticaloa	02 Eachchantheevu & Thirupperunthurai	Private	Agricultural & Home Garden	Palmyra	38
								Margosa	2
								Palu	1
								Acacia Catechu	1
6	5.60	6.90	1.30	01 Batticaloa	02 Thirupperunthurai & Urani	Govt. & Private	Abandoned Agricultural lands	Palmyra	12
								Coconut	12

C.VII. 33 kV distribution line Vavunathivu GSS to Karadiyanaru (13 km)

SN°	Kilometre		Distance (km)	N° of Districts and Names	N° of villages and names	Ownership of Land (Private, Government, Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
1	0.00	0.40	0.40	01 Batticaloa	01 Vavunathivu	Private & Government	Abandoned paddy land	Coconut	5
								Mango	1
								Kohomba	1
								Palmyra	7
2	0.40	11.40	11.00	01 Batticaloa	05 Vavunathivu, Palakkadu, Iththiyadimadu, Ayittiyamalai & Narippulthottam	Private	Paddy and home gardens	Coconut	11
								Cashew	3
								Tamarind	1
								Ficus virens	4
								Wood apple	1
								Palmyra	31

SN ^o	Kilometre		Distance (km)	N ^o of Districts and Names	N ^o of villages and names	Ownership of Land (Private, Government, Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
3	11.40	12.40	1.00	01 Batticaloa	02 Narippulthottam & Karadiyanaru	Private & Government	Paddy and home gardens	Wicks tree	3
								Bo tree	1
								Kumbuk	3
								Ficus	1
								Manjona tree	2
								Unknown	17
								Margosa	43
								Satinwood	6
								Ma dan	2
								Mango	1
								Tamarind	1
Coconut	6								
Palmyra	12								
Gansooriya	2								
Margosa	8								
Unknown	2								

C.IX. 33 kV distribution line Madampe GSS to Bowatte (20 km)

SI N ^o	Kilometre		Distance (km)	N ^o of Districts and Names	N ^o of villages and names	Ownership of Land (Private, Government, Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
1	0.00	0.55	0.55	Kurunagala	Bowatta	Private	Agriculture	Mee	01
								Kumbuk	01
								Kaduru	01
2	0.55	1.45	0.90	Kurunagala	Panawewa	Private/ Government	Agriculture		
3	1.45	1.85	0.40	Kurunagala	Panawewa	Private	Agriculture	Mee	01
								Kumbuk	01
								Karanda	01
4	1.85	2.25	0.40	Kurunagala	Panawewa	Private	Agriculture & Home garden	Coconut	02
								Cashew	01
								Bread fruit	01
								Teak	02
								Margosa	02
5	2.25	2.80	0.55	Kurunagala	Panawewa	Private	Home garden	Coconut	03
								Mango	04
								Jack	02
								Teak	01
6	2.80	3.35	0.55	Kurunagala	Kaduru wewa	Private/ Government	Home garden & plantation	Coconut	02
								Mango	02
								Jack	01
								Cashew	01
7	3.35	3.95	0.60	Kurunagala	Kaduru wewa	Private/ Government	Agriculture & Wewa	Margosa	02
								Kumbuk	02
								Nabada	01
8	3.95	4.55	0.60	Kurunagala	Kaduru wewa	Private	Agriculture & Coconut	Madan	01
								Karanda	02
								Kaduru	02
								Coconut	06
								Mee	01
9	4.55	4.90	0.35	Kurunagala	Kahawela	Private	Agriculture & Coconut	Coconut	03
10	4.90	5.65	0.75	Kurunagala	Horagas agare	Private	Coconut	Margosa	01
								Coconut	09
								Mango	01
11	5.65	6.80	1.15	Kurunagala	Horagas agare & Galispitiya	Private	Agriculture	Margosa	01
								Hora	01
								Coconut	04
								Madan	01
12	6.80	7.85	1.05	Kurunagala	Galispitiya & Galwalatta	Private	Agriculture & Coconut	Bakmee	01
								Coconut	04
								Teak	02
13	7.85	8.80	0.95	Kurunagala	Kowulwewa & Thethandaluwa	Private	Agriculture	Margosa	02
								Teak	02
								Coconut	05
14	8.80	9.65	0.85	Kurunagala	Thethandaluwa & Watuwatta	Private	Agriculture	Coconut	07
								Mango	03

SI N°	Kilometre		Distance (km)	N° of Districts and Names	N° of villages and names	Ownership of Land (Private, Government, Forest)	Use of Land (Agricultural, Plantation, barren/fallow)	Name of crops	Number of trees under cutting/trimming
	From	To							
15	9.65	10.15	0.50	Kurunagala	Watuwatta	Private	Agriculture & Home garden	Coconut	06
								Mango	02
								Teak	01
16	10.15	10.70	0.55	Kurunagala	Watuwatta & Rankettiyawa	Private	Agriculture & Coconut	Margosa	02
								Coconut	10
17	10.70	10.95	0.25	Kurunagala	Rankettiyawa	Private	Agriculture	Coconut	07
18	10.95	11.80	0.85	Kurunagala & Puttalam	Rankettiyawa & Kochcakaduwa	Private	Agriculture, Coconut & Home Garden	Kumbuk	02
								Rukattana	02
								Baringtonia	02
								Acacia	01
19	11.80	12.55	0.75	Puttalam	Kochcakaduwa	Private	Agriculture & Coconut	Coconut	03
								Acacia	01
								Coconut	10
								Mango	01
20	12.55	13.55	1.00	Puttalam	Kochcakaduwa & Galmuruwa	Private	Agriculture & Coconut	Nebada	01
								Kumbuk	02
								Kaduru	01
								Coconut	03
								Mango	02
Cashew	01								
21	13.55	14.30	0.75	Puttalam	Galmuruwa	Private	Agriculture & Coconut	Coconut	06
								Teak	02
22	14.30	15.55	1.25	Puttalam	Galmuruwa & Pallekele	Private	Agriculture	Bakmee	01
								Baringtonia	02
								Paramara	01
								Cashew	01
								Wood apple	02
								Palmyra	02
23	15.55	15.90	0.40	Puttalam	Pallekele	Private	Agriculture	Magosa	01
								Bakmee	01
								Baringtonia	01
								Paramara	02
								Acacia	02
								Palmyra	02
								Nebada	04
24	15.90	16.40	0.50	Puttalam	Hedabandaragama	Private	Agriculture	Bakmee	01
								Baringtonia	03
								Madan	01
								Kohomba	02
								Mee	01
25	16.40	17.15	0.75	Puttalam	Hedabandaragama & Potuwilla	Private	Agriculture & Coconut	Karanda	01
								Kaduru	01
								Coconut	04
								Kumbuk	02
								Nebada	01
26	17.15	18.05	0.90	Puttalam	Suduwella & Potuwilla	Private	Agriculture & Coconut	Kumbuk	03
								Nebada	04
								Coconut	05
27	18.05	18.15	0.10	Puttalam	Suduwella	Private	Coconut	Coconut	06
28	18.15	18.40	0.25	Puttalam	Suduwella	Private	Agriculture	Bakmee	01
								Coconut	02
								Cashew	03
29	18.40	18.80	0.40	Puttalam	Suduwella	Private	Agriculture & Home Garden	Margosa	03
								Madan	01
								Karanda	01
								Coconut	13
								Mango	02
								Cashew	01
Teak	02								
30	18.80	18.90	0.15	Puttalam	Suduwella	Private	Home garden	Coconut	06
								Mango	04
								Teak	05
								Margosa	04
31	18.90	19.25	0.30	Puttalam	Suduwella	Private	Home garden	Coconut	12
								Mango	02
								Teak	06
								Margosa	04

Annexure 5 Environment Management Plan (EMP)

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
Pre-construction						
Temporary use of lands	Impact to the existing environment	Selection of lands adhering to local laws and regulations and in close consultation with LAs Contraction facilities should be placed at least 500 m away from water bodies, natural flow paths, important ecological habitats and residential areas	Water and air quality	Air quality Standards and CEA water quality standards	CEB Contractor	Detailed design
Substation location and design	Noise generation Exposure to noise, Nuisance to neighbouring properties	Substation designed to ensure noise will not be a nuisance.	Expected noise emissions based on substation design, noise levels	Noise control regulations in 1994 Noise levels to be specified in tender documents	CEB	Detailed design
	Disturbance to the adjacent lands and the people due to cut and fill operations	Maintain adequate clearance, construction of retaining structures, minimise cut and fill operations adjoining to the dwellings	Proximity to houses and other structures	Setback distances to nearest houses – as per ROW norm of 10 m	CEB	Detailed design
Location of towers and line alignment and design	Exposure to safety related risks	Setback of dwellings to overhead line route designed in accordance with permitted level of power frequency and the regulation of supervision at sites.	Tower location and line alignment selection with respect to nearest dwellings	Setback distances to nearest houses -	CEB	Part of tower sighting survey and detailed alignment survey and design
	Impact on water bodies / land/ residences	Consideration of site location at where they could be located to avoid water bodies or agricultural land as much as possible. Careful site selection to avoid existing settlements	Site location away from water bodies, line alignment selection (distance to dwelling, water and/or agricultural land)	Consultation with local authorities and land owners, CEA water quality standards	CEB	Part of detailed project sighting and survey and design
Equipment specifications and design parameters	Release of chemicals and harmful gases in receptors (air, water, land)	PCBs not used in substation transformers or other project facilities or equipment.	Compliance with National Environmental (Amendment) Act, of Sri Lanka	Banned under schedule VIII of NEA Act	CEB	Detailed design
Encroachment into precious ecological areas	Loss of precious ecological values/ damage to precious species	Avoid encroachment by careful site and alignment selection Minimise the need by using existing towers and RoW wherever possible	Floral and faunal habitats loss	Flora and fauna protection act.	CEB	Detailed design
Involuntary resettlement or land acquisition	Loss of lands and structures	Compensation paid for temporary/ permanent loss of productive land as per Sri Lankan procedures	Public complaints	Rates stipulated in the Resettlement plan/ Frame work	CEB	Prior to construction phase

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
Encroachment into farmland	Loss of agricultural productivity	Use existing tower footings/towers wherever possible Avoid sighting new towers on farmland wherever Farmers compensated for any permanent loss of productive land trees that need to be trimmed or removed along RoW.	Tower location and line alignment selection Design of Implementation of Crop and tree compensation (based on affected area) Statutory approvals for tree trimming /removal	Agrarian Service Act. Consultation with local authorities and design engineers for the project	CEB	Part of detailed alignment survey and design
Interference with drainage patterns/Irrigation on channels	Temporary flooding hazards/loss of agricultural production	Appropriate sighting of towers to avoid channel interference	Site location and line alignment selection	Irrigation Act 1933. Consultation with local authorities and design engineers	CEB	Detailed alignment survey and design
Explosions/Fire	Hazards to life	Design of substations to include modern fire control systems/firewalls. Provision of fire fighting equipment to be located close to transformers, power generation equipment.	Substation design compliance with fire prevention and control codes	Tender document to mention detailed specifications	CEB	Part of detailed substation layout and design /drawings
Construction						
Removal or disturbance to other public utilities	Public inconvenient	Advance notice to the public about the time and the duration of the utility disruption Use of well trained and experienced machinery operators to reduce accidental damage to the public utilities Restore the utilities immediately to overcome public inconvenient	Disruption other commercial and public activities / Public complaints	Technical specification	CEB/ PRDA / NWSDB/SLT	Throughout the construction period
Acquisition of paddy fields and other lands	Loss of agricultural productivity	Avoid farming season wherever possible for the project activities. Ensure existing irrigation facilities are maintained in working condition Protect /preserve topsoil and reinstate after construction completed	Land area of agriculture loss Usage of existing utilities Status of facilities (earthwork in m ³)	Agrarian Service Act. Regular monitoring compliance with regulations	CEB, Contractor through contract provisions	Throughout the construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
		Repair /reinstate damaged bunds etc after construction completed	Implementation of Crop compensation (amount paid, dates, etc.)			
		Compensation for temporary loss in agricultural production				
Temporary outage of the electricity	Loss of power supply to the local community when distribution lines crossing the new line are switched off	Advance notice to the public about the time and the duration of the utility disruption Restore the utilities immediately to overcome public inconvenient.	Houses and commercial premises of power disruption	Regular monitoring during the period of strengthening the conductors	Contractor CEB	Throughout the construction period
Equipment layout and installation	Noise and vibrations	Selection of construction techniques and machinery to minimise ground disturbance.	Construction techniques and machinery	Minimal ground disturbance	CEB, Contractor through contract provisions	Construction period
Substation construction	Loss of soil	Fill for the substation foundations obtained by creating or improving local drain system.	Borrow area sighting (area of site in m ² and estimated volume in m ³)	Laws and regulations of respective LAs	CEB, Contractor through contract provisions	Construction period
	Water pollution	Construction activities involving significant ground disturbance (i.e. substation land forming) not undertaken during the monsoon season.	Seasonal start and finish of major earthworks (pH, BOD/COD, Suspended solids, other)	Timing of major disturbance activities - prior to start of construction activities	CEB, Contractor through contract provisions	Construction period
Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(a)])	Daytime construction only	CEB, Contractor through contract provisions	Construction period
	Nuisance to elephants if the line route construction crosses elephant path	Complete restriction of construction work for two months before and after the known period of migration by the elephants	Timing of Construction	No construction for two months	CEB, Contractor	Construction period
Construction schedules	Noise nuisance to neighbouring properties	Construction activities only undertaken during the day and local communities informed of the construction schedule.	Timing of construction (noise emissions, [dB(a)])	Daytime construction only	CEB, Contractor through contract provisions	Construction period
Provision of	Contamination of	Construction workforce facilities to include	Amenities for	Presence of proper	CEB,	Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
facilities for construction workers	receptors (land, water, air)	proper sanitation, water supply and waste disposal facilities.	Workforce facilities	sanitation, water supply and waste disposal facilities	Contractor through contract provisions	
Surplus earthwork/soil	Runoff to cause water pollution, solid waste disposal	Any excess material will only be used as fill material offsite when the owner's agreement has been obtained and with the disposal site restored in a manner that prevents erosion and does not block any drainage path	Location and amount (m ³) of fill disposal Soil disposal locations and volume (m ³)	Appropriate fill disposal and dispersal locations	CEB, Contractor through contract provisions	Construction period
Air Pollution	Loose dust might blow in the area causing dusty conditions	Damping of dust by sprinkling of water within the work area and stack the loose soil and contain it with covers if required.	Soil stacking locations, access roads, tower locations, gantry site	Air Quality Standards	CEB, Contractor through contract provisions	Construction period
Wood/vegetation harvesting, cut and fill operations	Loss of vegetation and deforestation	Construction workers prohibited from harvesting wood in the project area during their employment.	Illegal wood /vegetation harvesting (area in m ² , number of incidents reported)	Complaints by local people or other evidence of illegal harvesting	CEB, Contractor through contract provisions	Construction period
	Effect on fauna	Prevent his work force from disturbing to the flora, fauna including hunting of animal and fishing in water bodies Proper awareness programme regarding conservation of flora, fauna including ground vegetation to all drivers, operators and other workers	Habitat loss	Fauna and flora protection Act.	CEB/ DWC/ DoF	Construction period
Site clearance	Vegetation	Marking of vegetation to be removed prior to clearance, and strict control on clearing activities to ensure minimal clearance.	Vegetation marking and clearance control (area in m ²)	Felling of trees (Amendment Act. N ^o 01 of 2000 and act of felling of trees control) Clearance strictly limited to target vegetation	CEB, Contractor through contract provisions	Construction period
	Soil erosion and surface runoff	Construction in erosion and flood-prone areas should be restricted to the dry season	Soil erosion	Visual inspection (Turbidity and sedimentation)	CEB, Contractor through contract	Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
		Treat clearing and filling areas against flow acceleration and construction work should be carefully designed to minimise obstruction or destruction to natural drainage			provisions	
Mechanised construction	Noise, vibration and operator safety, efficient operation Noise, vibration, equipment wear and tear	Construction equipment to be well maintained. Proper maintenance and turning off equipment not in use.	Construction equipment - estimated noise emissions and operating schedules	Technical specifications, safety regulations, Noise control regulations in 1994	CEB, Contractor through contract provisions	Construction period
Construction of roads for accessibility	Increase in airborne dust particles Increased land requirement for temporary accessibility	Existing roads and tracks used for construction and maintenance access to the site wherever possible. New access ways restricted to a single carriageway width within the RoW.	Access roads, routes (length and width of new access roads to be constructed)	Use of established roads wherever possible Access restricted to single carriageway width within RoW	CEB, Contractor through contract provisions	Construction period
Transportation and storage of materials	Nuisance to the general public	Transport loading and unloading of construction materials should not cause nuisance to the people by way of noise, vibration and dust Avoid storage of construction materials beside the road, around water bodies, residential or public sensitive locations Construction materials should be stored in covered areas to ensure protection from dust, emissions and such materials should be bundled in environment friendly and nuisance free manner	Water and air quality	National Environment Act Laws and regulations of respective LAs National Emission Standards and CEA water quality standards	CEB/ CEA/LAs	Construction period
Trimming/cutting of trees within RoW	Fire hazards Loss of vegetation and deforestation	Trees allowed to grow up to a height within the RoW by maintaining adequate clearance between the top of tree and the conductor as per the regulations. Trees that can survive pruning to comply should be pruned instead of cleared.	Species-specific tree retention as approved by statutory authorities (average and maximum tree height at maturity, in metres) Disposal of cleared	Felling of trees (Amendment Act. No 01, of 2000 and act of felling of trees control) Presence of target species in RoW	CEB, Contractor through contract provisions	Construction period

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
		Felled trees and other cleared or pruned vegetation to be disposed of as authorised by the statutory bodies.	vegetation as approved by the statutory authorities (area cleared in m ²)	following vegetation clearance.		
Health and safety	Injury and sickness of workers and members of the public	Contract provisions specifying minimum setback requirements for construction camps from water bodies, reserved areas etc. Contractor to prepare and implement a health and safety plan. Contractor to arrange for health and safety awareness programmes	Contract clauses (number of incidents and total lost-work days caused by injuries and sickness)	Health and safety regulations	CEB (Contractor through contract provisions)	Construction period
Nuisance to nearby properties	Losses to neighbouring land uses/ values	Contract clauses specifying careful construction practices. Use existing access ways as much as possible. Productive land will be reinstated following completion of construction Compensation will be paid for loss of production, if any.	Contract clauses Design basis and layout Reinstatement of land status (area affected, m ²) Implementation of Tree/Crop compensation (amount paid)	Incorporating good construction management, design engineering practices Consultation with affected parties immediately after completion of construction and after the first harvest	CEB (Contractor through contract provisions)	Construction period
Operation and Maintenance Phase						
Electric shock	Death or injury to the workers and public	Security fences around substation Establishment of warning signs Careful design using appropriate technologies to minimise hazards	Proper maintenance of fences and sign boards Usage of appropriate technologies (lost work days due to illness and injuries)	Periodic maintenance Number of programmes and percent of staff /workers covered	CEB	Throughout the operation
Noise generation	Nuisance to the community around the site	Provision of noise barriers	Noise level	Noise level (db)- Once a year	CEB	Throughout the operation
Maintenance of Distribution line	Exposure to electromagnetic	Distribution line design to comply with the limits of electromagnetic interference from	Required ground clearance (metres)	Ground clearance -	CEB	Throughout the operation

Project Activity	Potential Environmental Impact	Mitigation Action	Monitoring Scope	Standards	Institutional Responsibility	Implementation Schedule
Substation maintenance	interference Exposure to electromagnetic interference	overhead power lines Substation design to comply with the limits of electromagnetic interference within floor area	Required vibrations level, instrumentation	Technical specifications	CEB	Throughout the operation
Oil spillage	Contamination of land/nearby water bodies	Substation transformers located within secure and impervious bundled areas with a storage capacity of at least 100% of the capacity of oil in transformers and associated reserve tanks.	Substation bounding ("as-built" diagrams)	National Environment Act, Bounding capacity and permeability	CEB	Throughout the operation

Annexure 6 Environmental Parameters and Periodicity for Environmental Monitoring Plan

Environmenta l component	Project stage	Parameters to be monitored	Location	Frequency	Standards	Rate (LKR)	Implementation	Supervision
1. Air Quality	A. Pre-construction stage (The project after assign to contractor)	SO ₂ , NO ₂ , CO, Pb, PM10, TSPM	Inside and outside (0.5 km) of the proposed gantry, near major building (more than one sample)	A single time	NAAQS of Sri Lanka	Per sample LKR 9,000	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	B. Construction Stage	SO ₂ , NO ₂ , CO, Pb, PM10, TSPM	Inside and outside (0.5 km) of the proposed gantry, near major building (more than one sample)	Two times	NAAQS of Sri Lanka	Per sample LKR 9,000	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	C. Operation Stage	SO ₂ , NO ₂ , CO, Pb, PM10, TSPM	Inside and outside (0.5 km) of the proposed gantry, near major building (more than one sample)	A single time	NAAQS of Sri Lanka	Per sample LKR 9,000	CEB by engaging approved monitoring agency(Sri Lankan Government)	CEB/CEA
2. Water Quality	A. Pre-construction stage (The project after assign to contractor)	EC, TSS, DO, BOD, P ^H Oil and grease, Pb, E	Nearest wells (2 wells) around gantry, waterbodies, lagoons (more than one sample)	A single time	CEA Water Quality Regulations	Per sample LKR 14,000	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	B. Construction Stage	EC, TSS, DO, BOD, P ^H Oil and grease, Pb, E	Nearest wells (2 wells) around gantry, waterbodies, lagoons (more than one sample)	1 time/ 3 months	CEA Water Quality Regulations	Per sample LKR 14,000	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	C. Operation Stage	EC, TSS, DO, BOD, P ^H Oil and grease, Pb, E	Nearest wells (2 wells) around gantry, waterbodies, lagoons (more than one sample)	1 time/ 3 months	CEA Water Quality Regulations	Per sample LKR 14,000	CEB by engaging approved monitoring agency(Sri Lankan Government)	CEB/CEA
3. Noise/ Vibration	A. Pre-construction stage (The project after assign to	Noise level (dB level)	Inside and outside (0.5 km) of the proposed gantry,	A single time	National Environmental (Noise	Per sample LKR 6,500	Contractor by engaging approved monitoring agency(Sri Lankan	Contractor/CE B/CEA

Environmenta I component	Project stage	Parameters to be monitored	Location	Frequency	Standards	Rate (LKR)	Implementation	Supervision
	contractor)		near major building (more than one sample)		Control) Regulations, NAAQS		Government)	
	B. Construction Stage	Noise level (dB level)	Inside and outside (0.5 km) of the proposed gantry, near major building (more than one sample)	2 times year	National Environmental (Noise Control) Regulations, NAAQS	Per sample LKR 6,500	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	C. Operation Stage	Noise level (dB level)	Inside and outside (0.5 km) of the proposed gantry, near major building (more than one sample)	3 times year	National Environmental (Noise Control) Regulations, NAAQS	Per sample LKR 6,500	CEB by engaging approved monitoring agency(Sri Lankan Government)	CEB/CEA
4. Soil	A. Pre-construction stage (The project after assign to contractor)	P ^H , Sulphate (SO ₃) , Chloride, ORP, Salinity, Resistively, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed substation	A single time	Technical specifications	Per sample LKR 13,500	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	B. Construction Stage	P ^H , Sulphate (SO ₃) , Chloride, ORP, Salinity, Resistively, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed substation	Two times	Technical specifications	Per sample LKR 13,500	Contractor by engaging approved monitoring agency(Sri Lankan Government)	Contractor/CE B/CEA
	C. Operation Stage	P ^H , Sulphate (SO ₃) , Chloride, ORP, Salinity, Resistively, Organic Matter, Moisture Content	Inside and outside (just close to the proposed site, 2 locations) of the proposed substation	A single time	Technical specifications	Per sample LKR 13,500	CEB by engaging approved monitoring agency(Sri Lankan Government)	CEB/CEA

Abbreviations:

SO₂- Sulphur Dioxide

Pb- Lead

EC- Electrical Conductivity

BOD- Biological Oxygen Demand

NWQS- National Water Quality Standards

NO₂- Nitrogen Dioxide

PM10- Particulate Matter <10

DO- Dissolved Oxygen

NAAQS- National Air Quality Standards

CEB- Ceylon Electricity Board

CO- Carbon Monoxide

TSPM- Total suspended Particulate Matter

TSS- Total Suspended Solis

CEA- Central Environmental Authority

Notes: Transport and Accommodation cost, NBT, VAT etc. are not included for the EMoP. Rates valid for the period of 60 days. Information based on the quotation provided by NBRO (National Building Research Organisation).

Annexure 7 Granting of Necessary Way leaves for Electricity Networks in Sri Lanka - Guidelines for Licensees, Divisional Secretaries and Landowners and/or Occupiers

(A DOCUMENT OF THE PUBLIC UTILITIES COMMISSION OF SRI LANKA dated 27th August 2009)

INTRODUCTION

- The enactment of the Sri Lanka Electricity Act N^o 20 of 2009 (SLEA) has vested powers with the Public Utilities Commission of Sri Lanka (the Commission) to regulate the electricity industry of Sri Lanka.
- Acting on the powers derived, PUCSL has granted licenses to the Ceylon Electricity Board (CEB) and Lanka Electricity Company (Pvt) Ltd (LECO). Accordingly, it has become their statutory duty to develop, maintain and operate efficient and economical systems for transmission and distribution of electricity.
- Transmission networks are owned and operated by the CEB, whereas the distribution systems are owned and operated by CEB and LECO.
- With more than 80% of the population having access to electricity in Sri Lanka, electricity transmission and distribution systems have been made available in almost all areas where there is human habitat. In the process, electric lines and associated equipment are (such as poles, conductors, reclosers, sectionalisers, various types of switches, metering equipment, staywires, transformers, etc.) installed over or under private lands.
- GoSL target is to provide electricity to all by 2015 and with the economic development taking place, demand for electricity is growing at a steady pace. This will necessitate the licensees to use more and more private lands in future as well, to install their networks.
- The licensees need to have access to these lands for the purposes of erecting, inspecting, maintaining, repairing, adjusting, altering, replacing or removing the lines or other equipment.
- In these Guidelines, 'wayleave' in relation to a land means such interest in the land as consists of a right of a licensee, to install and keep installed, an electric line: on, under, or over that land; and to have access to that land for the purposes of inspecting, maintaining, adjusting, repairing, altering, removing or replacing such electric line.
- This document is intended to provide general guidance to:
 - a) electricity licensees (CEB/LECO) who will be the applicants for the grant of wayleave;
 - b) the land owners/occupiers whose land is or may be the subject of such application; and
 - c) Divisional Secretaries (who are empowered to act as representatives of the Commission)
- In terms of Section 3(5) of Schedule I of SLEA, the Commission is empowered to appoint a person to act on behalf of the Commission to carry out specified functions relating to the grant of wayleave clearances.
- Accordingly, in terms of the Gazette Extraordinary N^o 1604/6 dated 1st June 2009, the Divisional Secretaries are appointed as representatives of the Commission, hereinafter referred to as "the Person Appointed by the Commission". Pursuant to the appointment as representatives of the Commission, the Divisional Secretaries are mandated to:
 - a) Look in to issues/objections of the relevant clearing of way-leaves and installation of electrical lines on lands owned by private parties by giving such parties fair hearing on behalf of the Commission and make recommendations to the Commission; and
 - b) Receive and acknowledge such issues/objections on the above from the relevant parties in writing on behalf of the Commission and to take appropriate actions as per above.

PROCEDURES TO BE FOLLOWED UNDER SLEA

- The Sections 3 to 7 of Schedule I of the SLEA govern the wayleave clearances whereas the Sections 7 to 10 of Schedule II govern the entry into premises.
- There are two possible scenarios relevant to the grant of a wayleave: for the installation of a new electric line/apparatus; or when there is a request by a landowner/occupier to remove an existing line/apparatus. The Person Appointed by the Commission would also have to consider the matters referred to in relation to the removal of trees which are/may obstruct, interfere or cause a danger to an electric line or plant.

1. Entry into Any Land or Premises

- Where a licensee wishes to enter a land or premises for the purpose of installing an electric line/plant, minimum of three (3) days notice (specimen notice: appendix 1) stating the nature and extent of the work intended to be carried out, has to be given to the occupier if the land is occupied and to the owner if it is not occupied.
- In cases where the land is not occupied and the name and the address of the owner cannot be ascertained, the notice referred to above should be exhibited at a conspicuous position of the land.
- If the land/premises is used/reserved for a public purpose, then the notice has to be given to the officer or any other person in charge of that land/premises.
- Licensee shall issue written authorisation to the person who is exercising the powers to enter the

land/premises.

- If by way of entering the land/premises, if any damage is caused to the land or to any movable or immovable property or caused any disturbance to any person, then he/she may claim compensation from the licensees. The Commission will determine the extent of compensation to be paid.
- Where the efforts made by a licensee to enter any premises under the powers conferred to it by the SLEA were unsuccessful, the permission should be sought by applying to the Magistrate's Courts having jurisdiction over the place and its decision shall be final.

2. Obtaining a Wayleave for a New Electricity Line/Plant

- All efforts should be made by the licensee who requires the wayleave, to enter into an agreement with the landowner/occupier to obtain such wayleave. The terms and conditions of the agreement shall include, among others, the period for which the wayleave is granted
- (if it is not permanent) and the compensation to be paid by the licensee for the disturbances
- and/or damages caused by the installation of the new line/plant.
- Where the licensee is unable to reach an agreement with the landowner/occupier in relation to obtaining the wayleave, it shall give the landowner/occupier a minimum of twenty one (21) days notice (specimen notice: appendix 4) requiring the grant of wayleave.
- If the landowner/occupier fails to grant the wayleave within the period specified in the notice or grants the wayleave subject to the terms and conditions which are not acceptable to the licensee, within seven (7) days from the expiry of the period specified in the notice, the licensee may make an application to the Person Appointed by the Commission requiring the grant of the wayleave. (particulars to be submitted along with an application to grant of wayleave.
- In the application, it is necessary for the licensee to prove that the acquisition of the wayleave is necessary to carry out its licensed activities and most importantly that it has taken all possible measures to reach an agreement, but have been unsuccessful.
- The application shall not be considered, if the proposed line is to be installed over a land which is covered by an authorised dwelling or permission has been granted to construct a dwelling.
- On the receipt of a successful application, the Person Appointed by the Commission will hold an inquiry, to provide an opportunity for the occupier or the land owner (where the occupier is not the owner) to be heard, and forward his/her recommendations to the Commission relating to the application within fourteen (14) days of the receipt of such application.
- Within six (6) weeks of the application, considering the recommendation of the Person Appointed by the Commission:
 - a) the Commission may either authorise or prohibit the licensee any of the acts mentioned in the notice (issued to the land owner or occupier) either unconditionally or subject to such terms, conditions and stipulations as it thinks fit; or
 - b) if the Commission is satisfied that the acquisition of that wayleave is necessary for carrying on of the activities authorised by the license of the licensee, recommend to the Minister to acquire the wayleave under the Land Acquisition Act.
- If the Commission's recommendation to acquire the wayleave is approved, the Minister may by an Order published in the Gazette acquire the wayleave under the Land Acquisition Act and transfer to the licensee. Wayleave acquired through the Land Acquisition Act shall not be subject to any provision of any enactment and shall bind any person who has been the owner/occupier of the land over which wayleave has been granted.
- In addition, the Person Appointed by the Commission will also recommend to the Commission the amounts of compensation payable to the owner or occupier of the land. Licensee is bound to pay compensation, as determined by the Commission, to the owner or occupier of the land. If the owner is unknown or the ownership is subject to dispute, licensee will deposit the sum to be paid as compensation in the district courts and inform the relevant parties accordingly or exhibit that notice at a conspicuous position of the land.
- Any person who is aggrieved by the Commission's determination on the subject of compensation could institute action in a Court of proper jurisdiction against the licensee.

3. When a Request is made by the Owner/Occupier of a Land to Remove an Existing Electricity Line or Plant

- Where an existing wayleave:
 - a) is determined by the expiration of the period specified in the agreement;
 - b) is terminated according to a term contained in the wayleave agreement; or
 - c) ceases to be binding following a change in ownership or occupancy,
 - d) the landowner/occupier may request for the removal of the electricity line/apparatus by giving three (3)

months' notice.

- On receipt of such notice, the licensee is required to comply with the notice and remove the electricity line/apparatus before the end of the specified period. However if it does not want to comply with the request, all efforts should be made by the licensee to enter into a fresh agreement with the landowner/occupier in order to secure such wayleave.
- Where the licensee is unable to reach an agreement with the landowner/occupier in relation to securing the wayleave, an application would have to be forwarded to the Person Appointed by the Commission to secure the wayleave (as explained in previous section), within three (3) months of the notice. (particulars to be submitted along with an application to secure the wayleave
- In the application, it is necessary for the licensee to prove that the wayleave is necessary to carry out its licensed activities and most importantly that it has taken all possible measures to reach an agreement, but have been unsuccessful.
- On the receipt of a successful application, the Person Appointed by the Commission will hold an inquiry, to provide an opportunity for the occupier or the land owner (where the occupier is not the owner) to be heard, and forward his/her recommendations to the Commission relating to the application within fourteen (14) days of the receipt of such application.
- Within six (6) weeks of the application, considering the recommendation of the Person Appointed by the Commission:
 - a) the Commission may either authorise or prohibit the licensee to keep installed the electricity line/apparatus specified in the notice issued by the land owner/occupier either unconditionally or subject to such terms, conditions and stipulations as it thinks fit; or
 - b) if the Commission is satisfied that the acquisition of that wayleave is necessary for carrying on of the activities authorised by the license of the licensee, recommend to the Minister to acquire the wayleave under the Land Acquisition Act.
- If the licensee is prohibited to keep installed the electricity line/apparatus specified in the notice, the licensee will be required to remove the electricity line/apparatus within one (1) month from the date of the Commission's decision or such longer period as the Commission may specify.

4. Removal of Trees which are/may Obstruct, Interfere an Electric Line/Plant or Constitute an Unacceptable Danger to Public (flow diagram showing the procedure: Appendix 8)

- When a tree is in close proximity to an electricity line/plant installed or to be installed and if the licensee is of the opinion that it will obstruct or interfere with the installation, maintenance or working of an electric line/plant or is a source of danger to public, a notice is required to be issued to the occupier of the land with a copy to the owner (where the occupier is not the owner) of the land requiring him/her to fell or lop the tree or cut back its roots, within a period of three (3) days.
- If the occupier complies with the notice, licensee shall pay the reasonable expenses incurred by him/her in complying with the requirements of the notice.
- If within three (3) days of the notice the requirements of the notice are not complied with and neither the owner nor occupier of the land gives a counter-notice, the licensee may cause the tree to be felled or lopped or its roots to be cut back so as to prevent it from obstructing or interfering with the installation, maintenance or working of an electric line/plant or being a source of danger to public. In doing so, the licensee shall:
 - a) Do it in accordance with good arboricultural practices and so as to do as little damages as possible to trees, fences, hedges and growing crops;
 - b) Cause the felled trees, lopped boughs or root cuttings to be removed in accordance with the direction of the owner or occupier; and
 - c) make good any damage caused to the land
- However, if a counter-notice is received objecting to the requirements of the notice within the three (3) days, the matter shall be referred to the Person Appointed by the Commission to hold an inquiry, where all parties will be heard. (particulars to be submitted along with such referral: appendix 9)
- On the receipt of such referral, the Person Appointed by the Commission will hold an inquiry, and forward his/her recommendations to the Commission within fourteen (14) days of the receipt of such referral.
- Upon receipt of the recommendation of the Person Appointed by the Commission, the Commission may make an order:
 - a) allowing the licensee to cause the tree to be felled or lopped or its roots to be cut back, after notifying any person by whom a counter notice was given; and
 - b) determining any question as to what expenses (if any) are to be paid to the licensee by the owner or occupier of the land.

Annexure 8: Environment Monitoring Report Illustrative Contents of Environment Monitoring Report

A8.0 Table Details of work award

Locations	Sub-projects components (Package No.)	Starting date of Implementation	Projected months of completion	Schedule date of completion (Extended date of completion)	Physical progress (%) as on -----

A8.1 Table: Details of On-going works

Locations	Sub-projects Components (Package No.)	Listing of works under the package	What type of works continued at present	Expected changes from approved scope	Fulfilment of objectives- Type of remedial measures needed	Key assumptions and risks that affect attainment of the objectives

A8.2 Table: Progress of Environmental Management Plan

SN o.	Environmental components related to project activities	Compliance		Explanation (in case of done or not done justification necessary)
PRECONSTRUCTION STAGE				
		YES	NO	
1	Site preparation work completed by PIU including necessary clearance.			
CONSTRUCTION STAGE				
2	PCBs not used in transformers or other project facilities or equipment Processes, equipment and systems not to use chlorofluorocarbons (CFCs), including halogen Use of PCBs and CFCs in the existing systems should be phased out and to be disposed of in a manner consistent with the requirements of the government.			AIR, CUTTING FILLING, LANDFILL WASTE WATER TREATMENT
3	Careful site selection to avoid existing settlements.			
4	Involuntary resettlement or land acquisition.			
5	Avoid encroachment into precious ecological			

SN o.	Environmental components related to project activities	Compliance	Explanation (in case of done or not done justification necessary)
	areas by careful siting and alignment selection.		
6	Avoid encroachment into forestland.		
7	Avoid encroachment into farmland.		
8	Better design to ensure noise will not be a nuisance.		
9	Appropriate placement of equipment to avoid drainage/channel interference.		
10	Equipment specification with respect to potential pollutants.		
11	Construction technique and machinery selection to minimize noise disturbance.		
12	Construction activities to be scheduled to avoid disturbance to farming activity.		
13	Construction equipment to be well maintained and turn of the plant not in use to avoid noise, vibration and operator safety.		
14	Existing roads and tracks used for construction and maintenance access to the line.		
15	Marking of vegetation to be removed prior to site clearance and strict control on clearance activities to ensure minimal clearances.		
16	For power evacuation line, trees allowed growing up to a height within the ROW by maintaining adequate clearance between the top of tree and the regulator as per the regulations. Trees that can survive pruning should be pruned instead of clearing.		
17	Construction workers prohibited from harvesting wood in the project area.		
18	Dispose scrap materials such as batteries, transformers, conductors, capacitors etc. in environmentally sound manner.		
19	Tree clearances/cutting as per forest/tree cutting act clearance.		
20	Excavated earth to be stored and reused for back filling.		
21	Fuels and other hazardous materials to be stored above high flood level.		
22	Noisy construction activities shall be carried out during day time.		
23	Construction workforce facilities to include proper sanitation, water supply and waste disposal facilities.		
24	Existing irrigation facilities are to be maintained. Use existing access roads for transportation of materials Protect/preserve top soil and reinstate after construction is completed Repair/reinstate damaged bunds etc. after construction.		
25	Take measures to prevent erosion and /or silt run off. Limit site clearing to work area Regeneration of vegetation to stabilize work areas on completion. Avoidance of excavation in wet season. Water courses protected from siltation through use of bunds and sedimentation ponds.		
26	Careful construction practices to avoid loss to neighboring properties. Productive land to be reinstated after construction Compensation for loss of production.		
27	Existing borrow sites will be used to source aggregates therefore no need to develop new sources for aggregates.		
28	Ensure health and safety of workers.		
29	Training to the EA environmental monitoring		

SN o.	Environmental components related to project activities	Compliance		Explanation (in case of done or not done justification necessary)
	personnel.			
30	Effective environmental monitoring system using checklist.			
31	Hiring of Environment and Social Consultant (s) by EA for implementation and monitoring of EMP.			