GOVERNMENT OF SIERRA LEONE
Ministry of Energy

ENERGY SECTOR UTILITY REFORM PROJECT (ESURP)
FREETOWN DISTRIBUTION SYSTEM REHABILITATION

Environmental and Social Management Plan (ESMP)

FINAL

SEPTEMBER 2018
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Acronyms and Abbreviations

ESURP  Energy Sector Utility Reform Project
AEPSD  Action for Environmental Protection and Sustainable Development
CBOs  Community Based organizations
dB  Decibels
DC  Direct Current
EA  Environmental Assessment
EDSA  Electricity Distribution and Supply Authority
EGTC  Electricity Generation and Transmission Company
EHS  Environmental, Health, and Safety
EIA  Environmental Impact Assessment
EMF  Electromagnetic Fields
EPA  Environment Protection Agency
ESHIA  Environmental, Social and Health Impact Assessment
ESMF  Environmental and Social Management Framework
ESMP  Environmental and Social Management Plan
FCC  Freetown City Council
FDSR  Freetown Distribution System Rehabilitation
FGD  Focus Group Discussions
GoSL  Government of Sierra Leone
GRM  Grievance Redress Mechanism
HCB  Hexachlorobenzene
IBRD  International Bank for Reconstruction and Development
IFC  International Finance Corporation
ITF  Inter Tropical Front
IVM  Integrated Vegetation Management
KII  Key Informant Interview
Kv  Kilo Volt
LFS  Life and Fire Safety
MDAs  Ministries Departments and Agencies
MLHE  Ministry of Lands, Housing and Environment
MoE  Ministry of Energy
Mv  Medium Voltage
NaCEF  National Commission on Environment and Forestry
NGOs  Non-governmental organizations
NPA  National Power Authority
PAPs  Project Affected Persons
PCBs  Polychlorobiphenyls
PHC  Population and Housing Census
PIU  Project Implementation Unit
PS8  Performance Standard
RAP  Resettlement Action Plan
RoW  Right-of-Way
S  Sections
SF₆  Sulfur hexafluoride
SLRA  Sierra Leone Roads Authority
ss  Subsections
T & D  T & D power solutions limited
UNCED  United Nations Conference for Environment and Development
WAMA  West African Monetary Agency
WBG  World Bank Group
EXECUTIVE SUMMARY

Introduction

The World Bank has credited Sierra Leone US $ 40m to implement the Energy Sector Utility Reform Project (ESURP) whose main goal is to upgrade the distribution lines, reduce losses in electricity supply to Freetown, and improve commercial performance of the Electricity Distribution and Supply Authority (EDSA).

Two Contractors have been procured to implement rehabilitation works as follows:

- Lot 1: Supply and Installation of 11 kV and Low Voltage Distribution Networks in selected locations in Freetown. This involves the replacement of existing Low Voltage lines and conversion of some underground cable lines to overhead lines.
- Lot 2: Refurbishment of existing 11 kV substations at Kingtom, Congo Cross, Brookfields, Falcon Bridge and 161 kV and Construction of new 11 kV Switching Stations complete with control building at Lumley Junction.

Based on the scope of works, it is expected that the implementation of the structural components of the project may extend moderate adverse environmental and social impacts on the immediate natural and social environment of the project. These impacts are largely expected to be limited and site specific.

On the basis of this and based on the requirements of the National Environmental Laws of Sierra Leone and World Bank’s Operational Policies on Environmental Assessment (OP4.01), an Environmental and Social Management Plan was considered appropriate to be undertaken. EDSA, the proponent, therefore undertook the task of preparing an Environmental and Social Management Plan (ESMP) of the project. The objective of the task is to prepare a detailed ESMP that identifies potential environmental and social impacts of the project and proffer management measures.

Project Background

Chapter 1 presents the project background and considers key electricity infrastructure and distribution issues that have triggered the implementation of ESURP and preparation of this ESMP. Long periods of neglect of the electricity distribution infrastructure in Freetown, the state of disrepair of primary Mv substations with substation batteries and circuit breakers mostly not functional, and DC supplies non-operational justified the credit request by the GoSL to the World Bank. In view of this, the WB credited Sierra Leone US $ 40m to implement the Energy Sector Utility Reform Project (ESURP). The effective date of the project was 15th December, 2014 and the end date is 31st August, 2020. EDSA is the proponent of the project and have undertaken the task to prepare and implement this ESMP.
The methodology adopted to prepare the ESMP is presented in Chapter 1. Screening was done to identify substations and distribution networks that required refurbishment, upgrade and replacement of poles. Stakeholders were identified and consulted. The relevant institutions that have bearing on the project, EDSA Project Implementation Unit (PIU), PMU of the Ministry of Energy, and EDSA Field Staff, project contractors and Project affected Persons (PAPs) were consulted. This was done in parallel with ground-trutting, visitations and inspections of the line route and substations, public community consultations, and focus group discussions with potential Project-Affected Persons (PAPs).

The methodology continued with a review of the existing legal regulatory and institutional framework covering the implementation of this project and the World Bank’s Operational Policies on Environmental Assessment (OP4.01). With all information obtained, a detailed analysis of impacts of project components was carried out and ended with the presentation of an Environmental and Social Management, and Monitoring Plans with associated costs.

**Legal and Policy Instruments and Institutional Framework**

Chapter 2 presents the legal and Policy Instrument and the Institutional Framework governing the implementation of this project. Provisions in a number of national policies, laws and regulations as well as international protocols and conventions Sierra Leone has signed up to have relevance to the implementation of the Freetown Distribution System Rehabilitation Project. The policy and legal instruments and institutional framework governing the implementation of this project provides guidelines with a view to ensuring protection of the physical and social environment, health and safety of workers and sustainable supply of electricity to Freetown.

The proponent reviewed a number of national policies, legal instruments as well as International Policies of the World Bank Operational Policy and guidelines on environment health and safety for Electric power transmission and distribution.

The national policies and legal instruments as well as the World Banks Operational Policy (O.P. 4.01) were reviewed and these include:

- The Constitution of Sierra Leone, 1991
- The National Environmental Policy (NEP), 1994
- Environment Protection Agency Act 2008 as amended in 2010
- Prohibition of Ozone Depleting Substances Regulations, 2010
- National Electricity Act, 2011
- Nuclear Safety and Radiation Protection Act, 2012
• The Sierra Leone Electricity and Water Regulatory Commission
• Sierra Leone Roads Authority (amendment) Act, 2010
• Public Lands Ordinance, Cap 116, 1808
• Unoccupied Lands Ordinance, Cap 117, 1911
• The Protectorate Land Ordinance, Cap 122, 1927
• National Land Policy, Sierra Leone, 2015
• Factories Act, 1974
• Local Government Act, 2004
• World Bank Operational Policies (OP 4.01) January, 1999 (Revised in 2013)

The following institutions were identified as having a cardinal role in the implementation, monitoring and mitigation of the impacts of this project. These include:

• The Ministry of Lands, Housing and Environment (MLHE)
• The Environment Protection Agency - SL (EPA-SL)
• The Ministry of Energy (MoE)
• Electricity Generation and Transmission Company (EGTC)
• The Electricity Distribution and Supply Authority (EDSA)
• The Sierra Leone Roads Authority (SLRA)
• Freetown City Council (FCC)

**The Project Environment**

A description of the project environment is presented in Chapter 3. Freetown, the capital city of Sierra Leone, is the focus of the EDSA Freetown Distribution System Rehabilitation System Project under the Energy Sector utility reform project (ESURP) for which this ESMP is prepared.

The electricity distribution network in the Western Area has suffered considerable damage from storms. Wind speeds in the coastal area are relatively high at an average of 3 – 4 m/s. During the rainy period, strong squalls develop which can cause damage to structures such as buildings, transmission and distribution poles. This situation is of concern in the hilly slopes of Freetown where the transmission systems tend to get damaged during the storms and create hazardous
conditions for the public. The climate and weather conditions therefore have to be monitored for effective operations and stability of the system.

The population figure of the Western Urban of 1,055,964 as from the 2015 Population and Housing Census represents nearly a fourfold increase in Freetown urban population before the start of the civil conflict in 1991. Many people from the rural areas moved into Freetown for refuge during the conflict. This has resulted in considerable pressure on land resources in Freetown and has particular significance for the protection of the 11 kV Low Voltage Distribution Networks in selected locations in Freetown. During the consultations with the Ministry of Lands, Housing and Environment, the land use pattern in the Greater Freetown area was projected to continue to grow in terms of the built environment. The line route for the installation of the 11 kV and Low Voltage Distribution Network in selected locations in Freetown lies mostly within the coastal low lands, which is at a high density of occupancy with residential houses, kiosks and make shift structures.

During our consultations with stakeholders, the rehabilitation, replacement of poles and underground cables as recommended by EDSA is appropriate and timely. The strong view of MoE/EDSA is that the substations need rehabilitation, poles and underground cables need replacement and the 11 kV and LV Distribution Networks also need replacement. A description of the site-specific characteristics of the 11 kV substations and 11 kV Switching Station at Lumley Junction, 11 kV and LV line routes and underground cable route as per Lot 1 and 2 of the project is given in Chapter 3.

The 11 kV Switching Station at Lumley Junction is full with encumbrances by way of encroachment into the buffer between the Station and adjacent buildings. Petty traders have constructed make shift structures close to the Station and under the poles. Some consideration for its relocation is recommended especially where compensation to claimants of the land and property poses serious challenge for their relocation or compensation.

**Environmental and Social Impact Identification**

Chapter 4 discusses the environmental and social impacts for the different phases of the project implementation which are:

- Pre-construction phase
- Construction phase
- Operation and Maintenance phase

During Pre-construction, the contractors will have to mobilize construction materials (poles, equipment, and connection gadgets) before the start of project works and these have to be stored in safe locations. It is proposed that substations inhabited by squatters and those with unused
clothing, empty charcoal bags, solid wastes and unauthorized structures in and around these areas be cleaned up.

During the construction phase, impacts are generally of a transient nature and will be felt mainly during the actual period of rehabilitation where some minor construction work may take place.

A major issue involved in the rehabilitation of the network includes transportation of equipment and materials to site from distant locations (on average 4 to 10km per trip).

The impacts associated with transportation would include:

- Noise from truck movements;
- Emissions from vehicle exhausts;
- Dust emission from haulage of sand;
- Damage to road surfaces and dust generation where roads are not paved;
- Possible road accidents including falling objects from trucks.
- Damage to private structures and properties

Other concerns during construction include:

- Waste generation;
- Chance archaeological finds during excavations;
- Safety of workers assembling poles.
- Damages to roofs during stringing of the lines

Exposure of soils to erosion and degradation from runoff shall be controlled by concreting the disturbed sites. As much as possible, the native ground cover beneath the lines shall be maintained.

Noise from grading machinery is unavoidable, however the nuisance effect in residential areas shall be abated by ensuring that work is not carried out beyond the daytime working hours. Wherever possible, manual methods shall be employed in place of machinery.

During the operational phase, the presence of transformers on the premises of substations introduces the potential environmental impacts inherent in transformer oils. Polychlorobiphenyls (PCBs) are harmful substances to the environment.

The presence, storage and use of oils, fuels and other flammable products on the premises of substations and work sites may give rise to the very likely hazards of fire outbreaks. Fire extinguishers have been recommended to be placed at substations and workers have to be trained to handle these extinguishers at substations and during construction periods.
The substations are located in relatively built up areas. Due to the voltages to be handled by the stations, it is important that they are made secured at all times and that unauthorized persons are kept away from the premises. The substations shall be suitably fenced to ward off persons from the premises. Padlocks shall be well maintained on the entrance to the substations. Also, security officers shall man the substations at all times to ensure security and report all incidents that might be out of the ordinary for prompt action. In addition, suitable warning signs indicating the dangers within shall be placed at regular intervals on the fencing to warn would-be encroachers. Chapter 4 (Four) ends up with a matrix of the environmental and social impacts of the project on the bio-physical and socio-cultural environment.

Environmental and Social Mitigation Measures

The mitigation measures envisioned by the proponent as a result of the environmental and social impacts to be triggered by the project are discussed in Chapter 5.

The mitigation measures that would ameliorate impacts during the pre-construction stage would include sensitizing populations on the hazards posed by exposure to live power systems, such as electrocution, fires, EMG effects etc. On the environment side, prior to the erection of the poles, repairs of distribution lines and substations, adequate provisions shall be made for handling (segregating and classification) of wastes and their proper disposal or re-use where possible. During the Pre-construction stage, drivers will be educated to avoid unnecessary blaring of horns and revving of engines especially in the vicinity of residences. During this stage, dust emission and emissions from vehicles may occur. The contractors shall ensure that all vehicles used are properly maintained to avoid excessive air pollution. To avoid accidents, drivers will be instructed to suitably secure materials been transported and shall ensure all trucks carry warning signals such as “flashing amber light” and “red flags” on long items such as wooden poles. The RoW as well as the tower routes/spots shall be suitably cleared and graded to make way for the rehabilitation of the existing lines and towers.

Mitigation measures during construction are provided in this Chapter 5. Exposure of soils to erosion and degradation from runoff shall be controlled by concreting the disturbed sites. As much as possible, the native ground cover beneath the lines shall be maintained. During the field surveys, it was noted that there were not many trees directly affected by the transmission lines. Some fruit and palm trees in way of towers will be affected. Poles that will be replaced on hill slopes will be highly prone to erosion and these shall be adequately protected by terracing or using stone cladding.

Noise from grading machinery is unavoidable, however the nuisance effect in residential areas shall be abated by ensuring that work is not carried out beyond the daytime working hours. Wherever possible, manual methods shall be employed in place of machinery.
The impact of loss of use of land and structures in the RoW by existing users will be addressed by the RAP consultant. Lumley substation which is located in a heavily populated area may pose some challenges in terms of upgrade and poles replacement.

In the case of poles that will have to be replaced, this will involve some excavation. Typical excavation for erecting the poles will be up to 1,500mm deep and the trenches will be excavated up to 600mm deep for underground cables. The soils dug out will be reused for backfilling.

In the case of the trenches that will be dug for the underground works, the contractor will disconnect cables that are obsolete and no longer to be used. In cases where the trench to be dug are of concrete nature, concrete will be used to resurface the areas dug. If it is asphalt surface that is dug, asphalt resurfacing will be done and if it was a surface that was of laterite, laterite shall be used to resurface the trench that will be dug. All old discarded poles, unused overhead materials and discarded underground cables will be handed over to EDSA for disposal or otherwise.

During the operation phase issues of storm drains, fire hazards and earthing of equipment may arise. Storm drain and flooding issues were evident during the ground-trutting exercise of the consultant on the network of channels leading to the substations at the West African Monetary Authority (WAMA) Substation, Lumley Substation and the Brookfields Substation around the junction of Kingharman Road and Main Motor Road. The authorities at WAMA have purchased a water-pumping machine to empty the storm drain whenever there is a heavy down pour of rain. The contractors for the substations (Lot 2) shall ensure that the drainage network around the substations is isolated from the oil and fuel storage to ensure that the storm water is not contaminated with oil products prior to discharge.

Based on the field survey reports, fire out breaks were reported at Lumley Substation and Rawdon Street substation and along the line routes from Lumley to Wilberforce particularly during heavy rains and wind. From the reports gathered in the field, fire outbreaks have often led to disastrous consequences. Measures therefore have to be put in place to ensure that fires do not break out in the substations. The in-house EDSA Safety and Fire Service must carry out a fire survey on the premises of each substation to identify and provide specific firefighting equipment for the substations. These pieces of equipment must be installed at vantage positions within the substations in addition to the standard water hydrants and fire extinguishers provided for all the substations. In addition, pruning of tall trees and clearance of vegetation inside and outside substation must be done quarterly. Also, fire buffers must be created and maintained around the fencing to ensure that potential fires from non insulated overhead cables and poles are not able to affect the substations and the poles.

EDSA shall ensure that good housekeeping is done at all times in the substations. Bird nests in areas likely to cause electrical faults shall be promptly removed and transferred to nearby trees, if practicable.
EDSA shall ensure that there is adequate earthing of equipment to prevent shocks and malfunctioning of protection equipment.

Evidence of possible resettlement issues have been mentioned in Chapter 4 dealing with environmental and social impact issues. The RAP will specify measures – cash compensation, replacement of structures, skills training, and transitional assistance – that will be implemented to mitigate the impact of displacement on the PAPs. This is particularly necessary especially around the Lumley Substation where population encroachment is heavy. A grievance redress mechanism (GRM) is recommended and shall function as a key mitigation measure for resolving disputes arising from impacts on communities.

Public Consultation

Chapter 6 deals with public consultation. Public consultations were done with reference to the World Bank safeguard policies on public consultation and disclosure (OP 4.01). The main objectives of the consultation process undertaken are as follows:

- To provide information about the project and its potential impacts to those interested in or affected by the project, and solicit their opinion to that regard;
- To understand and address stakeholder concerns and expectations of the project;
- To manage any unrealistic expectations and address misconceptions regarding the project;
- To ensure participation and acceptance of the project throughout the lifetime of the project by the key stakeholders including the community;
- To provide a mechanism to address any stakeholder grievances regarding the project;
- Verify that their issues have been considered by the technical investigations.

Consultations started during the screening stage right through the assessment stage and environmental and social management plan development stage. Stakeholders consulted included EDSA staff, PIU, Housing and Environment Departments in the Ministry of Lands, Housing and the Environment, SLRA, FCC, SierraTel, and potential PAPs. The techniques employed were focus group discussions and key informant interviews. Consultations done with stakeholders, project-affected groups and CBOs were participatory where PAPs were engaged in free, prior, and informed discussions. Consultations were also done with the T&D Power Solutions for Lot 1.

During the consultations, public safety, fire outbreaks, storms and storm drains and movement of birds causing fire sparks took center stage as some traders have built their kiosk very close to
substations and under electric poles. This exposed kiosk sellers to high risks such as non-ionizing radiations (EMF), transformer blasts, fire outbreaks, etc.

The issue of the RoW principles of 3 ft distance to public utilities like transmission poles and substations were also discussed, especially at the Lumley Substation where there is serious encroachment close to the Substation.

The issues of broken conductors, trees falling on distribution lines whenever there is storm, cutting off high tension lines and issues of thunder, explosion of switch gears when the level of gas in transformers are low or at high temperature also came out during the consultations.

The various mitigation measures presented in Chapter 5 were explained to allay the fears of the stakeholders and that these will be further discussed at a Public Disclosure meeting to be organized by EDSA. At the same time the enhancement benefits of the project in terms of improvement to the electrical infrastructure in the transmission and distribution system in Freetown and reduction in losses on the overall electricity system were explained to stakeholders as beneficial impacts.

Environmental, Social Management and Monitoring Plan

An Environmental Management Program and associated costs for the Freetown Distribution System Rehabilitation (FDSR) Project under the ESURP is presented in Chapter 7 and a Monitoring Plan is presented in Chapter 8.

A monitoring plan is proposed for the pre-construction, construction and operational phases of the project. Institutional responsibility and cost estimates are proposed for the various management and monitoring phases of the project.

To ensure that the contractors secure access to the transmission line route and rehabilitation and construction sites and clean up substations, the following measures are proposed:

- Control of encroachment into the RoW;
- Construct temporary barriers at construction and rehabilitation sites;
- Public education and awareness raising;
- Provide waste disposal sites for waste generated during substation cleanup.

During the construction phase, equipments and materials have to be transported to site, RoW have to be cleared, foundations have to be excavated for erecting poles, poles have to be replaced and lines have to be strung, substations have to be rehabilitated and new transformers and equipments installed. EDSA’s monitoring capacity has to be strengthened during this phase. Visual intrusion, waste generation mostly metals and insulators, health and safety risks of the workers, noise, dust, soil erosion, oil leaks are among the issues that have to be monitored. Waste
segregation and recycling of waste, provision of PPEs and adoption of safety measures are among the monitoring measures recommended in this ESMP.

The operational phase of the project may also cause health and safety issues; loss of income from fruit trees that may be pruned; waste may be generated during line route and substation maintenance; special public health and safety hazards related to insulating oils in transformers if not properly disposed. It is against this background that a hazards management, waste management and management of transformer oil leaks are proposed. Training and monitoring, as proposed in this ESMP, of these parameters is crucial for the successful operation of the project. The Environmental and Social Management Specialist (ESMS) at the PMU, the Environmentalist at EDSA and the Prevention and Maintenance Department of EDSA are very critical in ensuring effective monitoring of these parameters. The ESMP recommends that monitoring process may include collection of data on the various parameters, inspection of records, personnel evaluation and assessment and periodic assessment of progress. Monthly and quarterly reports, as recommended in this ESMP, shall be submitted to EDSA management for appropriate actions to be taken to mitigate these impacts.

The total estimated cost for monitoring activities stood at USD $ 33,000. The total estimated cost for ESMP activities is USD $ 63,000.

CONCLUSION

In conclusion, the Energy Sector Utility Reform Project has come at the right time to improve on the Freetown Electricity Infrastructure System. The project will upgrade the distribution lines, reduce losses in electricity supply to Freetown, and improve commercial performance of EDSA. The upgrade may, however, trigger some environmental and social impacts. EDSA, as discussed in this ESMP, shall take all necessary measures to mitigate these impacts. The benefits this project will bring in terms of enhancing the overall electricity distribution and supply system will go a long way to contribute to the socio-economic development of the residents of Freetown and by extension the country as a whole.

The replacement of wooden poles will enhance the status of the electrical infrastructure in the transmission and distribution network, which is a beneficial impact.
1 Introduction

1.1 Project Background

The Sierra Leone Government has secured credit from the World Bank to implement the Energy Sector Utility Reform Project (ESURP). The rationale of the ESURP is to upgrade the distribution lines, reduce losses in electricity supply to Freetown, and improve commercial performance of Electricity Distribution and Supply Authority (EDSA). A Project Implementation Unit (PIU), headed by a Project Coordinator, at the Ministry of Energy (MoE) is providing technical assistance to EDSA to implement a component of the ESURP project. This component involves the rehabilitation of selected 11 Kv substations and distribution lines in Freetown. The rehabilitation work will be executed by two different contractors that are already in the field. One of the contractors will be responsible for the upgrade of the supply and the distribution infrastructure of the 11kv and low voltage distribution networks in selected locations in Freetown. This involves the replacement of existing Low Voltage lines and conversion of some underground cable lines to overhead lines. The other contractor will be responsible for the refurbishment of existing 11kv substations at Kingtom, Congo Cross, Brookfields, Falcon Bridge and Freetown 161kv and Construction of new 11 Kv Switching station complete with control building at Lumley Junction.

1.2 Overview of key Issues

As a result of decades of neglect of the electricity distribution infrastructure in Freetown, the primary Mv substations are in a state of disrepair with substation batteries and circuit breakers mostly not functional, and DC supplies non-operational. Sections of the system are been overloaded, switchboards and protection relays faulty and there is serious risk of infrastructural damage occurring as a result of protection system or circuit breaker failure. The existing networks of cables and overhead lines have also been grossly affected leading to technical losses and unreliable supply to most parts of the city. Underground cables have become obsolete and with the growing demand for electricity, it is but very necessary that the entire supply and distribution network is upgraded to reduce technical losses and enhance reliability. Based on our findings, there are moderate adverse environmental and social impacts along distribution lines and substations. Before this time, an Environmental and Social Management Framework (ESMF) was prepared and disclosed to project stakeholders in February, 2013. The framework sets out the government’s legal structure and the general procedures for assessing and addressing adverse impacts that may be associated within the project.

It is with this background that an Environmental and Social Management Plan (ESMP) has been envisioned to be developed and disclosed to project stakeholders.
1.3 PIU/EDSA’s Obligations and Responsibilities

The PIU and EDSA shall be responsible for consultation with affected communities/people, acquiring way leave (if required), implementation and negotiations of the RAP and overseeing the design and construction and commissioning of the transmission line as well as coordinating the implementation and monitoring of the ESMP.

For the design, construction and operations, EDSA and the PIU shall also review and approve the design of the poles, specification of the cables and associated equipment/infrastructure and civil works contracts in accordance with various environmental and social standards.

1.4 Contractor Obligation

This ESMP shall be made available to the contractor. The contractor shall develop an operation manual which should be closely followed alongside this ESMP. EDSA/PIU shall maintain a monitoring and oversight responsibility to ensure that contractors are fulfilling their obligations.

1.5 Objectives of the ESMP

This ESMP document addresses three major concerns:

(i) Demonstrate the compliance of the proposed Environmental Protection Agency of Sierra Leone (EPA-SL) laws and regulations on the one hand, and the World Bank’s operational policy on environmental assessment (OP4.01), on the other. The EPA-SL EIA laws require a full blown ESHIA for projects with major impacts. However, for projects of such nature with moderate site specific impacts a full blown ESHIA is not required but rather an ESMP;

(ii) Assess the capacity building needs of stakeholders involved in the implementation of the ESMP; and

(iii) Proposes a set of mitigation measures for likely impacts of project activities in order to eliminate or minimize any negative impacts.

1.6 Approach and Methodology

This section details the approach and methodology that was adopted to prepare this ESMP.

The first phase was a Screening exercise to:

• Identify the substations and distribution networks that required refurbishment, upgrade and replacement of poles. of the rehabilitation of the substations and distribution network
that could have impacts on the environment and socio-cultural conditions within their sphere of influence;

- Identify all relevant stakeholders;
- Visit, ground-truth and inspect all substation sites, line routes and underground cable networks under the project;
- Preliminarily identification of the potential impacts and mitigation measures;
- Start a review of the Policy, legal and regulatory instruments and institutional arrangements relevant to the implementation of the ESURP ESMP.

This was followed by a second phase which focused on the following:

- Reviewing project documents and relevant background material, maps and their coordinates provided by EDSA PIU and the Contractors;
- Consulting with PIU, EDSA field staff, Environmental and Safety Department of EDSA
- Consultations with Project Affected Persons (PAPs) through focus group discussions and key informant interviews;
- Consulting with MDAs that included the Ministry of Lands, Housing and Environment (MLHE), EPA-SL, Freetown City Council (FCC), Sierra Leone Roads Authority (SLRA), Guma Valley Water Company, Sierratel;
- Reviewing the Policy, legal regulatory instruments and institutional arrangements covering environmental protection in Sierra Leone;
- Reviewing the existing Policy, legal and regulatory framework and institutional arrangements covering the establishment and operations of EDSA and Electricity Generation and Transmission Company (EGTC) particularly with regard to provisions for environmental compliance and safety issues;
- Sourcing of relevant information on appropriate clearance, Right-of-Way (RoW) limits and standards applied in the design, operation and maintenance of the distribution network in terms of safety and environmental protection;
- Reviewing existing World Bank publications covering relevant policies, procedures and other information related to the project including guidelines on electric transmission/distribution systems and industrial safety and hazard management;
- Establishing the appropriate framework for preparing an ESMP to meet the requirements for environmental protection and public safety.

Based on the findings and information obtained at the screening and second phases, a third phase was triggered that focused on:

- Detailed analysis of the components covering the distribution and line route network, pole replacement and substations upgrade that could have significant effects on the environment, health and safety of populations around the infrastructure, line route, underground cable replacement;
• Identification of positive impacts and enhancement measures;
• Environmental health and safety assessment of the Lumley and Kingtom Substations that have serious issues of encroachment, environmental health and safety issues;
• Complete consultations with all relevant stakeholders and potential PAPs to consolidate their inputs through focused group discussions and key informant interviews for the development of the management, monitoring plans and associated costs;
• Continue with further detailed analysis of impacts of project components;
• Source information for dealing with special issues, including waste disposal/handling and disposal of transformer oils;
• Develop a, Environmental Management, Mitigation and Monitoring Plans for dealing with the Environmental and Social impacts identified;
• Draft Report prepared and submitted.
2 Legal and Institutional framework

The legal and institutional framework governing ESMP usually provides guidelines with a view of ensuring protection of the environment and sustainable development. The legal provisions are found in the Environment Protection Act and other related legislations nationally. International policies like the World Bank operational policy were also considered and the International Finance Corporation (IFC) guidelines on environment health and safety for Electric power transmission and distribution also reviewed.

2.1 Legal Framework: National legislations and regulation

2.1.1 The constitution of Sierra Leone 1991

The 1991 constitution of Sierra Leone is a set of fundamental rules and precedents, which governs Sierra Leone. This constitution has fourteen chapters with numerous parts, sections (S) and subsections (ss). It sets the framework for the three arms of government, which are the Executive, Legislature and the Judiciary.

Our 1991 constitution is silent on Environmental related issues, which was not topical in our jurisdiction at that material time hence it was over sighted. In 2013 to 2016, the country undertook a constitutional review process where the environment or Environmental Impact Assessment (EIA) made headlines in that document. The country still awaits a referendum to make it the new rulebook on Environmental and natural resources management.

2.1.2 Environment Protection Agency Act 2008 as amended in 2010

Section (S). 2 subsections (ss).1 of the Environment Protection Agency (EPA) Act of 2008 establish a body cooperates that is responsible for effective protection of the Environment for sustainable development.

Part IV of the EPA’s Act of 2008 highlights the concept of Environmental Impact Assessment (EIA). S.23 ss.1 states that individuals or body cooperate are required to undertake an EIA for any project that causes:

- substantial changes in renewable resource use (e.g. conversion of land to agricultural production, forestry or to pasture land, rural development, timber production);
- substantial changes in farming and fisheries practices (e.g. introduction of new crops, large scale mechanization or use of chemicals in agriculture);
• exploitation of hydraulic resources (e.g. dams, drainage and irrigation projects, water basin development, water supply);
• infrastructure (e.g. roads, bridges, airports, harbours, transmission lines, pipelines, railways);
• industrial activities (e.g. metallurgical plants, wood processing plants, chemical plants, power plants, cement plants, refinery and petro-chemical plants, agro-industries).
• extractive industries (e.g. mining, quarrying, extraction of sand, gravel, salt, peat, oil and gas);
• waste management and disposal (e.g. sewerage systems and treatment plants, landfills, treatment plants for household and hazardous waste);
• housing construction and development schemes;
• establishment of places of entertainment, motor repair garages and welding shops
• Importation of second hand vehicles. Etc.

Any individual or other group, who skip this process, commits an offence and will be punished as per the prescription of the law in the EPA’s Act of 2008. The following factors are determined whether a project requires an Environmental Impact Assessment after an application has been sent to the environmental Protection Agency including the description of the project:

• The environmental impact on the community;
• The location of the project;
• Whether the project transforms the locality;
• Whether the project has or is likely to have substantial impact on the ecosystem of the locality;
• Whether the project results in the diminution of the aesthetic, recreational scientific, historical, cultural or other environmental quality of the locality;
• Whether the project will endanger any species of flora or fauna or the habitat of the flora or fauna;
• The scale of the project;
• The extent of the degradation of the quality of the environment
• Whether the project will result in an increase in demand for natural resources in the locality;
• The cumulative impact of the project together with other activities or projects, on the environment.

According to the Third Schedule of the EPA Act, 2008 the contents of an EIA will encompass the following.

• The location of the project and its surroundings;
• The principle, concept and purpose of the project;
• The direct or indirect effects that the project is likely to have on the environment;
• The social, economic and cultural effect that the project is likely to have on people and society;
• The communities, interested parties and Government ministries consulted;
• Any actions or measures which may avoid, prevent, change, mitigate or remedy the likely effect on people and society;
• Any alternatives to the proposed project;
• Natural resources in the locality to be used in the project;
• The plans for decommissioning of the project;
• Such other information as may be necessary for a proper review of the potential environmental impact of the project.

In concluding this Sub Section (Chapter 2.1.2), the National Act on Environmental Impact Assessments, that is, the EPA Act, 2008, does not categorize projects into A, B, C or D. What it does in the Schedules are to state projects that require an EIA (First Schedule), factors for determining whether projects require an EIA (Second Schedule) and the contents of an EIA (Third Schedule).

The Act is silent on whether an ESMP is required of any of the projects that require an EIA. What is close to signaling that an ESMP is required for such power transmission line projects is to state in the Third Schedule (f) that an EIA should contain a true statement and description of any actions or measures which may avoid, prevent, change, mitigate or remedy the likely effect on people or society.

Thus, as most EIAs have management plans including ESMPs and Community Development Action Plans (CDAPs), it may be on these grounds that the preparation of an ESMP, which details a true description of measures and actions to mitigate impacts of the project on the environment, has been triggered by this project.

### 2.1.3 Prohibition of Ozone Depleting Substances Regulations, 2010

This regulation further expands on part five of the EPA’s Act 2008 making it unlawful to import chlorofluorocarbons, other fully halogenated chlorofluorocarbons, halon, carbon tetrachloride, 1,1,1-trichloroethane, methylbromide; without permission from the Environment Protection Agency of Sierra Leone (EPA-SL).

### 2.1.4 National Electricity Act of 2011

This Act unbundled the former National Power Authority (NPA) to two separate entities thus:

a. EGTC and

b. EDSA
Part VI outlines EDSA’s cardinal function as the supply, distribution and retail sale of electricity for the entire country except in areas where a license has been issued to another qualified entity.

Part X of the National Electricity Act of 2011 deals with land acquisition and related environmental practices. This Act gives the Minister Powers to acquire land for EGTC or EDSA or both even if the land is private or some private interest in the land subject to payment of adequate compensation. Compensation of such land is paid by the GoSL firstly and the Authority or company will reimburse government at a later time.

During the life of EGTC or EDSA or both will at any time decide to sell, lease or dispose of any land easement, property or interest in any land or waterway in a proper manner.

This Act gives the authority for breaking streets for the purpose of laying any supply line at any height across any street or road and the erection of poles and any other erections for the purpose. The company or Authority should consult the relevant ministry before breaking any street and they should make good the street or road after the breakage.

S.58 of the National Electricity Act 2011, gives power to cut or lop any tree shrub or hedge, which obstructs or interfere with any supply line of the company or the authority, the laying or erection of any supply line or proposed route of the supply. A fourteen days’ notice should be given to the occupier of the land before the lopping and cutting of any tree, shrub or hedge.

S.59 and S.60 of the said Act talks about the power to enter land acquired by the Authority or company for certain purpose; given reasonable notice to the occupier of any land with the intention to enter and notice of the intention to enter and construct respectively.

Electric cables should not be placed across any navigable waterway whether above or below or underground without the consent and approval of the Minister.

Finally, all companies or independent power producers should comply with all environmental health and safety legislations as per S.62.

2.1.5 Nuclear Safety and Radiation Protection Act of 2012

This Act delineates issues dealing with radiation, which is also of environmental concern. The significance of this Act is to regulate, control and supervise the acquisition, importation, exportation, transportation and disposal of radioactive substances and devices emitting ionizing radiation.

S.29 and S.30 of this Act clearly states that a license is required for the export and import, re-export, transit, transshipment of any nuclear material, equipment or technology. Written application of such license should be made to the radiation authority together with an assessment of the nature of the radioactive substance or device emitting ionizing radiation and the magnitude and likelihood of exposure attributed to the substance or device; a description of the installation
or practice; a safety impact assessment for the protection of workers and the public; all relevant
information to support the application; and the prescribed fee.

2.1.6 The Sierra Leone Electricity and Water Regulatory Commission

This Act facilitates the regulation of the quality of electricity and water services. It deals mainly
with electricity and water tariffs for proper or standard service delivery to consumers at an
appropriate price.

2.1.7 Sierra Leone Roads Authority (amendment) Act of 2010

Sierra Leone Roads Authority (SLRA) Act of 2010 is an amendment of the SLRA Act of 1992. The
Authority has the legal mandate to set out the width of the right of way as per the amendment
of Act No.2 of 1992 S. 5 ss.2 paragraph C which states “…. For the attainment of the object stated
in ss. 1 the Authority shall set the width of the right of way for roads which forms part of the
national network.”

2.1.8 Public Lands Ordinance

Part 1 of CAP 116 of the public lands ordinance deals with the acquisition of land and the
provision of the Ordinance may not apply to the Provinces.
Under the Public Lands Ordinance Law the GoSL can acquire any land in the public interest as
stated in S.4. The declarations for the warrant of acquisition for such land are Gazetted. S.5 of the
public land ordinance carves out the processes in informing the owner or owners of the land
accordingly.
Parts 1 of this ordinance also outline the following:

- Power to enter into a survey;
- Power to enter and take a land by the Director of Surveys and Land with all necessary
  workmen and other servants;
- How to mark out land acquired for the service or use of Government;
- Plan and certificate to be registered;
- Registration to be conclusive;
- Power of the minister to sell lease when public work is abandoned or land is superfluous
to requirement;
- Cases in which the owner refuses to give up possession and so on.

Part 2 of the ordinance provides for payment of compensation to the affected persons. S.15 of the
ordinance states that, the affected persons of any land appropriated by government for public
benefited shall be entitled to compensation as per the value of the land. Compensation cannot be
determined in isolation; as per S.16 of the ordinance compensation should be determined together
with the owner or the occupier or any other person having interest in a land that has been
appropriated by Government.
The following are also highlighted in part 2 of this ordinance

- Cases of disputed compensation;
- Matters to consider in determining compensation;
- Matter to be neglecting in determining compensation etc.

2.1.9 Unoccupied Lands Ordinance

S.4 Cap117 of this ordinance states that any land that is vacant for 12 years and above shall be deemed to be unoccupied; hence Government can declare such land to be crown land and proceed to control and manage such lands as public lands.

The exceptions to this general rule are:

- Where the claimant or claimants of the land herein shows a valid instrument or instruments;
- Where the land is been cultivated with perennial crops with permanent economic value and
- Where the land form part of the public register and plans of town lot and country lot.

In a case where an unoccupied land is been claimed by the crown, the ordinance also distills out processes and procedures how claimant or claimants should thread within the hegemony of the law like:

- The time for the claimant to send in their claims;
- Persons wrongfully claiming a land;
- Undisputed claim and so on.

2.1.10 The Protectorate Land ordinance

Lands in the provinces are vested in tribal authorities who are trustees for the native communities concerned. S. 3 ss.1 of the protectorate land ordinance (CAP 122) states no land in the provinces will be obtained unless permission is been sought or consent obtained from tribal authorities for the occupation of such lands herein.

ss. 2 goes further to state the importance of notifying the District Commissioner in acquiring lands in the provinces for a lawful gain of title by non-natives. This ordinance is so dynamic in a way that it proffers scenarios were lands are given to non-natives without been leased (ss.3). As per the dictates of this subsection, a memorandum of the terms of the occupation is put together and registered in the decree book. Ideally, the maximum time for such agreement is three (3) years except in cases where permanent projects or perennial crops which terms should be captured in the memorandum.

In S (4) of the ordinance herein, non-native can acquire an interest in land for up to seventy one (71) years in two terms. The first term is fifty (50) years and the second term is for an additional twenty one (21) years. In S. 6, tenancy agreement for more than three years must be under seal
except with the consent of the District Commissioner to a deed; and such deed should be in conformity to S. 9 therein.

2.1.11 The Concessions Ordinance, 1931

(Cap 121) S. 9 empower the Government to acquire interests in land of any size for periods not longer than 99 years. Lands acquired in this way are referred to as government reservations. Such lands are reserved as residential quarters for government employees, offices for the government machinery, forest reserves etc. In situations where government has not paid ground rents reserved under leases to the land owners, some landowners encroach on such lands and alienate parts of such lands to developers.

2.1.12 Sierra Leone National Land Policy 2015

This Policy highlight Land distribution (acquisition and allocation), access to land by all Sierra Leoneans and investors, land tenure systems, land use planning and regulations, land management and administration systems and land adjudication systems.

The following are policy statements in the National Land Policy:

A. After the coming into force of this Policy the sovereign title to Government/State lands and public lands shall vest in the National Lands Commission as follows:-
   I. As to Government/State lands in trust for the citizens of Sierra Leone as a whole; and
   II. As to public lands in trust for the citizens of Sierra Leone as a whole or in trust for the particular community that originally owned the land as prescribed by the statute or other law creating the same; and

B. The sovereign title to private lands shall henceforth vest as follows:-
   I. As to land held under freehold tenure in the Western Area in the individual, group of individuals or Corporate entity absolutely;
   II. As to communal lands in the Provinces in the new Chiefdom Lands Committee (instead of the Chiefdom Council) in trust for the particular community concerned;
   III. As to family lands held under family tenure in the Province in the family as a unit;
   IV. As to land held under Customary tenure in the Provinces in the Chiefdom Lands Committee/Village Area Lands Committee or the family which made the grant of usufructuary rights in perpetuity to the groups or individuals or corporate entity subject to the grantor’s residuary rights.
According to the policy, acquisition must be necessary in the interest of:-

1. Defense;
2. Public safety;
3. Public order;
4. Public morality;
5. Public health;
6. Town and Country Planning; and
7. The development and utilization of the property to promote the public benefit;

2.1.13 The National Environmental Policy (NEP) 1994

The NEP recognizes the importance of:

- Conservation and sustainable utilization of the national biological resources; Establishing environmental protection standards, monitoring changes in, and publishing relevant data on environmental quality and resource use;

- Providing for prior EIA of proposed activity likely to have an adverse effect on the environment;

- Cooperation with other countries and agencies for optimal use, prevention or

- Abatement and protection from transboundary transfer of natural resources and

- Raising public awareness and promote understanding of environmental issues and problems and to encourage individual and community participation in environmental improvement efforts which are all essential in addressing the issues of Biosafety.

The following Sectoral policies are highlighted within the National Environmental Policy:

- Land Tenure, Land Use and Soil Conservation;
- Water Resources Management;
- Forestry and Wildlife;
- Biodiversity and Cultural Heritage;
- Air Quality and Noise;
- Sanitation and Waste Management;
- Toxic and Hazardous Substances;
- Mining and Mineral Resources;
• Coastal and Marine Resources;
• Working Environment (Occupational Health and Safety);
• Energy Production and Use.

2.1.14 Factories Act, 1974

This Act talks about the workplace health and safety thus:

• That sufficient and suitable sanitary facilities to be provided for employees;
• That printed copies of any regulations made under any part of the act which are to be enforced within the workplace should be posted in the factory;
• Owners of factories shall make sure necessary precautions are taken to ensure the safety of employees;
• Competent persons should be in charge of machinery and that two or more engineers should not be in charge of one machinery;
• That any factory machinery developing more than 250 horsepower or where any amount develops more than 75 horse-power, all such machinery should be under the general supervision of an engineer;
• Every factory having machinery developing more than 250 horse-power all such machinery shall be inspected regularly by an engineer;
• Accidents should be reported to the respective authorities as prescribed in the act;

2.1.15 Local Government Act, 2004

This Act focuses on having a meaningful decentralization and devolution of Government functions through the establishment and operation of local councils around the country. It recognizes local councils as the highest political authority in the locality and shall have legislative and executive powers to be exercised in accordance with this Act or any other enactment. Local councils shall be responsible, generally for promoting the development of the locality and the people’s welfare in the locality with the resources at its disposal and with such resources and capacity as it can mobilize from the central government and its agencies, national and international organizations, and the private sector. Local councils have the responsibility to prepare a development plan, which shall guide the development of the locality.
2.2 **Institutional Framework**

2.2.1 **Environment Protection Agency, Sierra Leone (EPA-SL)**

The Environment Protection Agency was set up to replace the National Commission for Environment and Forestry (NaCEF), which was mandated to oversee issues pertaining to the environment and forestry. The Environment Protection Agency was established with a Board of Directors set up as its governing body. This Board consists of a Chairman and representatives from the various line Ministries and a Unit as stated in section 3 of Part II of the Environment Protection Agency Act. Subject to this Act, the Board shall have the control and supervision of the Agency. The Agency shall act in liaison and co-operation with government agencies to control pollution and the general protection of the environment. The Agency, subject to this Act, shall promote effective planning in the management of the environment, coordinate and monitor the implementation of the Act.

2.2.2 **The Ministry of Energy (MoE)**

The Ministry of Energy is the arm of the GoSL tasked with the responsibility to formulate and implement policies, projects and programmes on energy and provide oversight functions across the entire energy supply chain for all sub-sector agencies (which include electricity production, electricity transmission, electricity distribution and supply) and other forms of energy supply and utilization coordinating and managing all aspects of energy in its various forms in the country.

2.2.3 **Electricity Generation and Transmission Company (EGTC)**

EGTC is responsible for the generation, transmission of electricity and sale of electricity to EDSA as per the power purchase agreement approved. EGTC will also manage the national transmission grid, which connects electricity generation sources to customer centers for distribution.

2.2.4 **The Electricity Distribution and Supply Authority (EDSA)**

EDSA is responsible for the supply of electricity. Key functions of EDSA include:

- Be responsible for the supply, distribution and retail sale of electricity for the entire country except in areas which the Commission has issued a distribution license to another appropriately qualified entity;
- Be responsible for dispatch and system control of electricity within its territory;
- Establish as far as is practicable uniform standard voltages throughout its area of supply;
- Secure the supply of electricity at reasonable prices;
• Carry on any business usually associated with electricity distribution and supply;

• Promote and encourage the economic and efficient use of electricity, especially for domestic, commercial, agricultural, industrial and manufacturing purposes;

• Perform any other functions incidental or consequential to its functions under the 2011 Act.

2.2.5 The Sierra Leone Roads Authority (SLRA)

The SLRA is the institution responsible for managing roads in the country. Their mandate is to develop and maintain the national roads network, advise Government on general road policies and contribute to addressing transport concerns, among others. The SLRA manages RoW issues in Sierra Leone.

2.3 Relevant International Conventions/Policies and Regulations/Safeguards

2.3.1 World Bank Operational Policies (OP 4.01) January 1999 (Revised in 2013)

World Bank demands Environmental Assessment (EA) of projects proposed for Bank financing to help ensure that they are environmentally sound and sustainable, and thus to improve decision making. EA typically evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation. However, the Bank favors preventive measures over mitigatory or compensatory measures, whenever feasible.

One important thematic area of this policy is the role of public consultation and disclosure in EA; the project proponent is required to consult PAPs and local Non-Governmental Organizations (NGOs) about the project's environmental aspects and takes their views into account. Consultations should be initiated as early as possible and should continue throughout project implementation as necessary to address EA-related issues that affect them.

Draft reports on EA should be made available to the relevant stakeholders in a timely manner prior to consultation and in a form and language that are understandable and accessible to the groups being consulted. Printed copies of this report should be made accessible to the PAPs and local NGOs in certain public places.
2.3.2 World Bank Group (WBG) Guidelines: Environmental, Health, and Safety
Guidelines General EHS Guidelines, 2007

The Environmental, Health, and Safety (EHS) Guidelines are technical reference documents with
general and industry-specific examples of good international industry practice. When one or
more members of the WBG are involved in a project, these EHS guidelines are applied as required
by their respective policies and standards. These general EHS guidelines are designed to be used
together with the relevant Industry Sector EHS guidelines, which provide guidance to users on
EHS issues in specific industry sectors.

Under the EHS guidelines, the World Bank has several guidelines many of which are applicable
to various components of the proposed project namely:

EHS Guidelines - Environmental

- Hazardous Materials Management
- Waste Management
- Noise
- Contaminated Land

EHS Guidelines - Occupational Health and Safety

- General Facility Design and Operation
- Communication and Training
- Physical Hazards
- Chemical Hazards
- Biological Hazards
- Personal Protective Equipment (PPE)
- Special Hazard Environments
- Monitoring

EHS Guidelines – Community Health and Safety

- Structural Safety of Project Infrastructure
- Life and Fire Safety (L&FS)
• Traffic Safety
• Transport of Hazardous Materials
• Emergency Preparedness and Response

EHS Guidelines - Construction and Decommissioning

• Environment
• Occupational Health & Safety
• Community Health & Safety

2.3.3 The Stockholm Convention on Persistent Organic Pollutants.

This Convention was adopted on the 22\textsuperscript{nd} May, 2001 in Stockholm and Sierra Leone became a signatory to this convention on the 27\textsuperscript{th} August, 2001.

Persistent Organic Pollutants (POPs) are chemicals that are persistent bio-accumulators found in fatty tissues. They are bio-magnified through the food chain, and adversely affect health and the environment.

This convention recommends the elimination or restriction of production and use of all internationally produced POPs (i.e. Industrial chemicals and pesticides) The chemicals to be eliminated are Aldrin, Chlordane, Dieldrin, Endrin, Heptachlor, Hexachlorobenzen (HCB), Mirixtexaphene, Polychlorinated Biphensylsis (PCBs).

The convention also seeks to continue minimization and, where feasible, ultimate elimination of the release of POPs, such as Dioxins and Furans.

Stockpiles and waste containing POPs must be managed and disposed of in a safe, efficient and environmentally friendly manner with regards to international rules, standards and guidelines.
3 Description of Project Environment

3.1 Introduction

There is an urgent need to rehabilitate and upgrade the electricity supply and distribution infrastructure in Freetown area, dilapidated during the civil war and subsequent 10 years of neglect. Primary MV substations in Freetown, the capital city of Sierra Leone, are in a state of disrepair, substation batteries and circuit breakers are mostly not functional, and DC supplies nonoperational. Sections of the system are overloaded; protection relays are faulty and there is a serious risk of infrastructure damage occurring as a result of protection system or circuit breaker failure.

The Government of Sierra Leone (GoSL), under tremendous pressure from the rising demand for electricity supply, has acquired a credit facility from the International Bank for Reconstruction and Development (IBRD) for an energy access project known as the Sierra Leone Energy Sector Utility Reform Project (ESURP). This project involve the upgrading and rehabilitation of key primary Medium Voltage (MV) network infrastructure, including aged MV substations and distribution lines in the Greater Freetown area, and this component is known as the Freetown Distribution System Rehabilitation (FDSR).

The envisaged upgrade will require that certain existing links to be replaced with appropriately sized cables/overhead lines, and will help reduce technical losses and enhance reliability. Appropriately matching needed investments in MV feeder upgrade to appropriate investments in corresponding substations will enable systematic system upgrade and protection of infrastructure. In particular, it should be noted there has been an increase in demand in certain areas from newly established commercial operations and consideration has to be given to expanding the network to meet this demand.

The rehabilitation works have been divided into two lots as follows:

- Lot 1: Supply and Installation of 11 kV and Low Voltage Distribution Networks in selected locations in Freetown. This involves the replacement of existing Low Voltage lines and conversion of some underground cable lines to overhead lines;
- Lot 2: Refurbishment of existing 11 kV substations at Kingtom, Congo Cross, Brookfields, Falcon Bridge and 161 kV and Construction of new 11 kV Switching Stations complete with control building at Lumley Junction.
3.2 Geographical Environment

3.2.1 General

Sierra Leone is bounded on the North and East by Guinea, on the southeast by Liberia, and on the southwest and west by the Atlantic Ocean. The total area of the country is 71,740 km². The country is divided into five (5) administrative regions: the Northern, Eastern, Southern North-Western Provinces and Western Area.

Freetown, the capital city of Sierra Leone is part of the Western Area, which is the focus of the EDSA Freetown Distribution System Rehabilitation Project under the ESURP for which this ESMP is prepared. For power distribution purposes, the Western Area is divided into the Eastern villages, Greater Freetown, Western Rural areas and the Mountain area.

Generally, the coastal area of Freetown is a low-lying plain extended inland from the Atlantic Ocean. The area closest to the ocean is a largely swampy region; however, the Sierra Leone Peninsula, where Freetown is situated, is dominated by hills. To the East, the land rises from the coastal plain to a plateau in the North and to hilly terrain in the South.
3.2.2 Climate

Climate data covering the entire Western Urban District of Freetown was obtained from the Meteorology Department in Freetown. The department collates monthly rainfall and temperature data for all districts in the country. Monthly rainfall data was available for Western Urban district covering January 2000 to July 2017. Monthly temperature data was available from January 2003 to December 2012. The rainfall and temperature data for the Western Urban district was used to describe the climate of the project environment in Freetown.

The climate of Sierra Leone is a monsoon type humid tropical climate with two distinct seasons. The dry season is from November to April and the rainy season is from May to October. The annual rainfall averages about 3,000 mm, ranging from a low reading of 2,000 mm in the North to a high reading of 4,000 mm in the South. Average monthly temperature ranges from 23°C to 29°C, but it can rise to an average maximum of 36°C in the lowlands towards the end of the dry
season while in the highlands the average monthly temperature could be as low as 15°C at the beginning of the dry season.

The seasonality of the weather conditions described above is primarily the result of the north-south movement of a zone of discontinuity often referred to as the Inter Tropical Front (ITF). As the belt oscillates slowly across West Africa, the country is alternately affected by Southwest winds bringing moist air that often results in rains, and the Northeast dry winds. Like the rest of Sierra Leone, Freetown and the Western Area experience the highest rainfall in the month of August with an average monthly of 229.7 mm over the period 2000 – 2015. The rainy season is from May to October, with the average monthly increasing from 81.4 mm in May to 200.24 mm in August, and drops to 132 mm in October. The dry season starts from November, with the average monthly decreasing from 78.6 in November to 7.6 mm in April. The lowest average monthly was recorded in January (3.2 mm) over the period 2005 – 2015. Figure 2 and Figure 3 are a histogram and a graph of the average monthly rainfall distribution in Freetown from 2005 to 2015, respectively.

![All Year Rainfall Averages in Freetown for 2005 - 2015](image)

**Figure 2: Histogram of Average monthly rainfall of Freetown 2005 - 2015**
The electricity distribution network in the Western Area has suffered considerable damage from storms. Wind speeds in the coastal area are relatively high at an average of 3 – 4 m/s. During the rainy period, strong squalls develop which can cause damage to structures such as buildings, transmission and distribution poles. This situation is of concern in the hilly slopes of Freetown where the distribution systems tend to be damaged during the storms and create hazardous conditions for the public.

### 3.2.3 Temperature

The highest temperature recorded for Freetown within the 10-year period is 31\(^\circ\) C. This is particularly from November to May during the dry season. The lowest temperature ever recorded is 24\(^\circ\) C, but this occurs for relatively shorter periods during the brief spell of Harmattan winds experienced in late December to early January. The Harmattan is a dry air that originates from the Sahara Desert usually featured by increased wind strength (north east winds), sudden drop in relative humidity, cloudless sky and dusty haze, stable air that prevents precipitation. Average monthly temperatures for July and October are slightly lower, ranging from 28\(^\circ\) C to 30\(^\circ\) C.

Temperatures are higher from November to April. The highest average monthly temperature for the period 2003 – 2012 was recorded for March (33.75 \(^\circ\)C). The average monthly temperature rises from November to December and experiences a slight fall in January. This may be as a result of the brief spell of Harmattan winds experienced in late December to early January. The Harmattan is a dry air that originates from the Sahara Desert usually featured by increased wind strength (northeast winds), sudden drop in relative humidity, cloudless sky and dusty haze, stable air that prevents precipitation. Temperatures are relatively higher during the afternoons, but lower for the rest of the day. This period, which occurs between December and January, is replaced by a dry but humid period that extends to the end of March.

Figure 3: Line graph of Average monthly rainfall of Freetown 2000 - 2016

Figure 4 and Figure 5 are a histogram
and a graph of the monthly temperature distribution in Freetown from January to December 2017 respectively.

Figure 4: Histogram of the monthly temperature distribution in Freetown from January to December 2017

Figure 5: Graph of the monthly temperature distribution in Freetown from January to December 2017 respectively

3.2.4 Land Use

Freetown is sited on the Southern bank of the estuary of the Sierra Leone River. The city lies on sloping ground at the foot of a range of hills. It is bordered on the North and the East by the Sierra Leone River, to the South by the hills, and to the West by the Atlantic Ocean. During the consultations with the Ministry of Lands, Housing and Environment, the land use pattern in the Greater Freetown area was projected to continue to grow in terms of the built up environment. The line route for the installation of the 11 kV and Low Voltage Distribution Network in selected
locations in Freetown lies mostly within the coastal low lands, which is at a high density of occupancy with residential houses, kiosks and make shift structures.

The lack of adequate planning and development control over the years, as well as constraints to development posed by the conflict (1991-2002) has led to rather inefficient land use. The residential settlements are expanding on the coastal lowlands with increasing encroachment on the hill slopes. Generally, conditions of housing in the central parts of the city have deteriorated due to overcrowding in the low income areas. Commercial activities are concentrated in the central business district and development of shops. Offices and workshops are expanding along the roads leading to the city centre. Industrial activities, on the other hand, are concentrated in the eastern part of the city. Lumley, one of the settlements to benefit from the upgrade and rehabilitation of the supply and distribution system, is a fast growing community with commercial shops sprouting up along the RoW of the distribution system of EDSA. All these developments place excessive demands on utility services and have a direct bearing on the expectations on the refurbishment of the existing 11 kV substations at Kingtom, Congo Cross, Brookfields, Falcon Bridge and Freetown 161 kV and Construction of the new 11 kV Switching Station complete with control building at Lumley Junction.

3.2.5 Population Characteristics

Sierra Leone recorded a total population 7,092,113 for the 2015 Population and Housing Census (PHC). This comprises a household population of 7,076,119 and an institutional population of 15,994. The population of the Western Area Rural is 444,270 and Western Area Urban is 1,055,964.

Sierra Leone’s population has been on the increase since 1963 census. It increased from 2,180,355 in 1963 to 2,735,159 in 1974 and 3,515,812 in 1985. From 2004 to 2015, the population has increased from 4,976,871 to 7,092,113, representing an inter-censal percentage increase of 42.5%.

The average annual growth rate between 2004 and 2015 is 3.2 percent compared to 1.8 percent from 1985 to 2004 and 2.3 percent from 1974 to 1985. The relatively low growth from 1985 to 2004 (1.8%) could be attributed to the 11-year civil war. In the Western Area, the focus of this ESMP, the growth rate between 2004 and 2015 was 4.2 percent.

This population figure of the Western Urban of 1,055,964 in 2015 represents nearly a fourfold increase in Freetown urban population before the start of the civil conflict in 1991. Many people from the rural areas moved into Freetown for refuge during the conflict. This has resulted in considerable pressure on land resources in the Freetown and has particular significance for the protection of the 11 kV Low Voltage Distribution Networks in selected locations in Freetown.

Table 1: Below is a breakdown of the population by district in the Western Area Urban

<table>
<thead>
<tr>
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<td>188,576</td>
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</table>

Source: 2015 Population and Housing Census, Statistics Sierra Leone

The table above which, gives a breakdown of population in the Western Urban Area, clearly shows that the project environment has a population of well over 1,500 and this has very serious implication for electricity supply and distribution considering the expansion of commercial enterprises and residential population.
Figure 6: Substation at Kington and Brookfields
3.3 SITE SPECIFIC CHARACTERISTICS

3.3.1 Falcon Bridge Substation

This primary substation is fenced with concrete walls right round the facility. Speaking with the Load Shedding Officer, the consultant was informed that a Manual is used for load shedding and that they have a Zonal Switching Programme.

The substation receives power from Kington and Blackhall Road.

The issues of concern are:

- The Line Route from Falcon Bridge to the West African Monetary Agency (WAMA) has some encumbrances - there are trees that need to be felled along this line route.
- The distribution line cables need rehabilitation along the route to the WAMA and the line route from the back of the Substation to WAMA is full with kiosks, petty traders and temporary stalls.
- The distribution line cables appear to be substandard and old.
- The cables are not tensioned and this is a built up environment with heavy vehicular traffic creating implications for safety and security.

3.3.2 Line Route from Falcon Bridge to Zenith Bank, Rawdon Street

The line route is along a built up environment and the RoW is congested with kiosks, bread sellers with temporary stalls.

3.3.3 Lumley Substation

This substation is housed in a concrete building. The substation building is squeezed between two three-storey buildings. The owner of the building on the left of the substation, Mr. Ecundayo Alex Morgan, argued that the substation has been built on their land. The younger brother of Mr. Ecundayo Alex Morgan, Mr. Larry Morgan produced a conveyance to show ownership of their property. There is a 3 (three) feet buffer between this building on the left and the substation structure unlike the building on the right. The three-storey building on the right of the substation is owned by one Mr. Chernor Jalloh.

There is no good sanitation inside the substation as the consultant saw unused clothing and garbage inside the substation. There are safety and security issues here. Bread sellers and Orange/Africell Top-up sellers have tables under the 11 kV poles with exposed cables. The bread sellers informed the consultant that fire has broke out at this substation several times especially when there is heavy wind and storm. The consultant was also informed that during heavy rains, the substation becomes flooded as the drainage around the substation is not well constructed or garbage has blocked the drains. The potential for fire hazard at this substation is apparent. During consultation with potential project affected persons, they were informed about the danger of having their stalls/kiosks close to the substation. The owner of the building on the left was issued stop work verbal notice as he is currently erecting a stair that is riding on top of the substation. The angle poles that receive and send out electricity installed just outside the substation is
seriously affected by this upcoming concrete structure. There is indeed a real resettlement issue here.

Angle poles at the Lumley Junction going to Beach Road are seriously encroached upon. Kiosks and stalls have been erected around the poles with no buffer. The address is No.1 Beach Road and the owner of shop is a dealer in chicken sausages, rice and provision. The Consultant consulted the kiosks/stall/shop owners and they were informed of the potential dangers of fire, health, safety and security issues with their business kiosks/stall around and close to these high tension poles and cables.

3.3.4 Line Route from Lumley to Wilberforce

Wall fences that have been built along the RoW and no buffer of even 3m have been left between the building lines of these wall fences and the poles. There are trees close to the MV Line along this line route. The trees are above 1.25m along this line route.

3.3.5 Wilberforce Substation

This is a primary substation. The station is in a concrete and secure building. The wall fence at the back is not high enough to ward off people who might want to scale this fence. Drug dealers who are sometimes chased by Police personnel easily scale the fence and enter the compound. Hassan Conteh with mobile number 076613466 the supervisor at the facility explained that this is often the case and this has safety and security implications. Razor wires should be installed all round the wall fence and the height of the sidewall fence has to be increased.

3.3.6 P & T Substation – Wilberforce Main Motor Road

There are many tall trees along the RoW from Wilberforce substation to P &T. The trees have to be pruned to a minimum height for them not to interfere with the lines. There is a security issue here, as the facility had no padlock to close the main gate to the facility. This is a security issue. Persons can enter the facility and cause havoc. The issue of the padlock at the P & T Substation was brought to the attention of the supervisor of the Wilberforce substation, as this is his jurisdiction.

3.3.7 Sisters Mess, Military 34 Hospital

The facility is housed in a concrete structure with wall fence. However, vegetation undergrowth is springing up and they need to be cleared. No stalls or kiosks around.

Further, I discovered security issues, as the facility was not secure.

3.3.8 Hill Station Junction Substation

A building is under construction close to the facility with less that 2m buffer. Existing poles close to the new construction have been discarded but yet to be removed. Abdulai Conteh, contractor for the building promised to ensure the poles are removed. New poles have been erected.
3.3.9 Milhelm Flat- Hill Cut Junction Substation
Squatters were seen in the building where the facility is housed. There are tall trees above 1.25m.

3.3.10 Tourism Ministry Substation, Brookfields
The facility is secure in a building. However, one tree needs to be cut as it is hanging overhead the facility.

3.3.11 Brookfields Primary Substation
There is a serious storm drain problem at this facility. This problem here has been compounded by the current *GENTO Road construction along Kingharman Road*. Also, trees above 1.25 m and vegetation are within the compound. The trees need to be pruned.

3.3.12 Mandallay factory (super holding) secondary sub substation, Kingtom
The substation at Mandallay factory which is now super holdings is in a deplorable condition with report of leakages during the rains. From inspection, there are cracks all over the structure with report of some explosive incident two weeks back, where there was a heavy blast that resulted to injuries sustained by a driver of super holding company who is still on medical leave. At the back there are huge trees covering the roof of the structure.

Adjacent to the structure in question there are two transformers which are not covered, and an eyewitness explain how it exploded two years back causing lots of damages.

3.3.13 Underground Environment from Kingtom Substation to Falcon Bridge and Hill Cot Road to Kingharman Road
The social environment for the underground works is beset with a number of petty traders owning kiosks who have occupied the RoW, where the underground trenches will have to be dug. The depth of the trenches according to the contractors for Lot 1 of the project will be 600 mm. From the screening and ground truthing by the consultant, most of the cables appear to have some faults. From our discussions with the EDSA engineers, the faults happen as a result of age, puncture, and storm water along the trenches, corrosion or thieves mutilate the cables to sell as the copper or aluminum that these cables contain have a high currency value.

The underground cables sometimes explode because of current overload. Again, the cables get punctured by utility companies (GUMA, Sierratel, or SLRA). There is the complaint from EDSA engineers of lack of coordination between the utility companies and EDSA staff and often there is no consultation by the utility companies and the underground staff of EDSA.
4.0 Environmental and Social Impacts

4.1 Introduction

This Chapter discusses the impacts expected at various stages of implementation of the project. The identification of these impacts has been informed during our screening of the project, ground-truthing, consultations with professionals in various MDAs and also by comments and concerns of affected stakeholders. The Chapter will identify activities that may extend environmental and social impacts.

4.2 Environmental and Social Impact Identification

The impacts are discussed for the different phases of the project implementation, which are:

- Pre-construction phase
- Construction phase
- Operation and Maintenance phase

In addition, there are certain issues such as potential impacts of oil in transformers, effects of electromagnetic fields (EMF) etc. that are discussed under a separate section on special issues.

4.2.1 Pre-Construction Phase

The contractors will have to mobilize poles, equipments, materials and connection gadgets before the start of project works and these have to be stored in safe environments. The contractors for Lots 1 and 2 have to settle for a storage site of these materials. This was not identified during our consultations with the Lot 1 Contractors. The safety of the storage site may pose some risk to the environment and residents around the site where the storage facility will be located. There is need to ensure safety measures such as placement of signages and demarcation bill boards around the storage site and placed at strategic points to ward off unauthorized persons from the storage site.

Securing access to transmission line routes, substations and exposed parts of the transmission and distribution network - the main activities to be carried out prior to commencement of construction works are in connection with the need to secure access to transmission line routes and also to prevent further public access to substations and other exposed parts of the T & D network. There is also the need to clean up the substations and remove persons, unused clothing, empty charcoal bags, solid waste and unauthorized structures in and around them.

Applying the EDSA safety rules, working in substations and switching stations with live conductors, the minimum clearance from such live electrical installations should be 2.6m. It is recommended that such a minimum buffer should be established around all outdoor installations.
The Central Business District of Freetown has grown in population over the years as is reflected in the population census figures of 2015. Overcrowded settlements and congestion of the streets of the city centre (Rawdon Street, Siaka Stevens Street, Wilberforce Street, Regent Road etc) and surrounding districts (Lumley, Congo Cross, Kingtom, Wilberforce, and Hill Station) as a result of expansion of settlements, residential houses, and business enterprises may pose risks to safety during assembly of works in the pre-construction phase of the project. The distance between poles to be replaced, as mentioned by the Lot 1 contractors, will have to be 70m apart for the 11 kV overhead Line Route and 40m for the LV overhead Line Route. Also, average depth for excavation of the trenches for underground works will have to be 600mm.

Thus, mobilization of poles, equipments and materials to work sites and securing access to these sites, especially in these congested and overcrowded streets and settlements may have serious challenges to the contractors given the fact that development (residential, commercial) has overtaken planning in these areas. The substations would generate considerable amounts of waste (some of it hazardous) which would need to be properly handled. In some cases, cleaning may temporarily impact adversely on ambient air quality but would be beneficial in the long term.

Another cause of concern has to do with the collaboration between the Housing Department, FCC and the utility companies in managing the RoW. The Housing Department is now under the Ministry of Lands, Housing and Environment under the current administration. It was under the Ministry of Works, Infrastructure and National Assets in the previous administration. The Council issues permits and business licenses to a number of business entities in the municipality of Freetown (construction companies, cookery shops, tailoring shops, garages, pharmacies, kiosks, ‘omolankays’, restaurants, factories cinema halls) as per the Local Government Act, 2004. The RoW is managed by SLRA.

The absence of collaboration and coordination in development control of the RoW in the municipality of Freetown, the project environment, makes the possibility of environmental impact during pre-construction stage of this project apparent.

4.2.2 Construction Phase

As with most projects of this nature, construction phase impacts are generally of a transient nature and will be felt mainly during the actual period of rehabilitation where some minor construction work may take place. Impacts related to physical and economic displacement will be addressed in the RAP and the implementation of the RAP will be aligned with the ESMP to guide land access and construction schedule of the project.

Although piles of sand and other construction materials have been known to be abandoned at worksites long after project completion, the issues involved in the rehabilitation of the network include:
• Transportation of equipment and materials to site, involving medium to heavy duty trucks carrying loads to the various construction sites along the tower route and to substation sites; and
• Storage of the materials, with an average travel distance of about 4 to 10km per trip. The road network to most of the sites is quite adequate although access to the sites within the center of Freetown and hilly areas could be difficult because of petty trading activities, disrupted building lines and hilly areas.

The impacts associated with transportation would include:

• Noise from truck movements;
• Emissions from vehicle exhausts;
• Dust emission from haulage of sand;
• Damage to road surfaces and dust generation where roads are not paved;
• Possible road accidents including falling objects from trucks.

These impacts would affect soil, air ambient noise, land use and occupational/public health and safety.

4.2.2.1 Impacts arising from digging trenches for underground works

The impacts arising from this activity include:

• Exposure of soils to erosion and degradation from runoff;
• Noise from grading machinery;
• Sediments and runoff from exposed soil surfaces polluting receiving water bodies;
• Loss of use of land and structures in RoW by existing users who are within the vertical clearance limit.

4.2.2.2 Other impacts arising from installation and construction works

The adverse impacts associated with these works such as noise and dust generation are similar to those discussed earlier. Other concerns include:

• Waste generation;
• Chance archaeological finds during excavations;
• Safety of workers assembling tower members.

Construction activities tend to generate noise both from machinery as well as from the workers on site at level sometimes going beyond 90 dBA. This impact would be significant especially in those sections of the project that pass through residential areas where the acceptable noise level should be less than 60 dBA. The impact of construction noise on residents shall be mitigated by
avoiding work during the night. In addition, contractors and workers will be instructed to minimize noise during working periods.

Excavation works and site clearing generate dust in the working environment especially during the dry season. This impact is limited to the construction period and may not be very significant in relation to the project under consideration. The recommended mitigation is to spray exposed surface and sand heaps with water.

Typical waste generated during the construction will be mainly solid waste made up of cleared vegetation, excavated soils, packaging materials and excess/damaged construction materials. All wastes shall be separated and useful items such as wood pieces would be given out to workers for use as fuel wood. Waste receptacles shall be provided at all work sites to be emptied periodically by the contractor.

Usually during excavations, there is the possibility of encountering buried items of archaeological or cultural/historical significance. Any such finds shall be duly notified to the authorities for appropriate action. A chance finds procedure clause is included in the contractors’ contracts for repairs.

Workers assembling towers and poles have to work at heights of up to 10 m and beyond and there is the risk of slipping/falling. Adequate personnel safety equipment including safety climbing belts and appropriate clothing shall be provided for all workers engaged in such activities.

Stringing of lines and replacement of existing cables and conductors will be mostly carried out manually. There may be the need to use mobile cranes to assist with the replacement of old and worn-out poles along the 11 kV line and LV Line. Such works will require careful monitoring to avoid accidents. The stringing process will pose occupational health and safety hazards.

A major impact of erecting and stringing towers/poles is the visual intrusion impact. During the field survey, it was observed that many of the LV overhead lines are strung haphazardly creating aesthetic problems particularly within the Lumley, Kington, Brookfields area and the city center. The impact caused by visual intrusion is mainly associated with the 11 kV and LV overhead lines and can be significant in areas of the business district and residential areas. In many parts of Freetown, the poor physical planning and development has resulted in indiscriminately scattered overhead lines, which are visually disruptive.

Overhead lines may create collision hazards to birds; birds, which tend to rest on power lines may be affected by heat and electric fields. This type of impact may be considered as residual.

The other significant impact expected from this activity is the large amounts of waste to be generated from replacing over 1,000 wooden poles and a huge quantity of damaged conductors.
In addition, the wooden cores of the new conductors, which will be used for the stringing and replacements, will remain as waste material. Other wastes will include broken and damaged insulators and other similar equipment.

4.2.3 Operational phase

4.2.3.1 Transformer oils

The presence of transformers on the premises of substations introduces the potential environmental impacts inherent in transformer oils. Polychlorobiphenyls (PCBs) are harmful substances to the environment. They are not produced during electricity generation or distribution, but are contained in certain equipment, mainly in transformers and condensers. These are often purchases from the manufacturers of electrical equipment who use them because of their perfect dielectric properties. The transformer oils shall be collected and handled adequately. The Electricity and Distribution Authority of the Ministry shall be engaged for these activities. The EPA-SL and the Stockholm Convention Regulations together with the World Bank Environmental Safety Guidelines for the control of Noxious Chemical Substances will be referred. The transformers to be purchased should meet all applicable safety standards and must be enclosed in separate secondary containment structures that will prevent any accidental spills or routine leakages that may occur from being released to the environment. The transformers will be serviced outside the country. No further mitigation measures will be required.

4.2.3.2 Fire hazards

The presence, storage and use of oils, fuels and other flammable products on the premises of substations and work sites may give rise to the very likely hazards of fire outbreaks. In addition, there always is a likelihood of fire outbreaks in substations and work sites that are sited in areas where flammable materials are stored. Some mitigation measures have been proposed for this impact.

4.2.3.3 Noise

Assessments of existing substations in the Freetown municipality indicate that generated noise could be heard up to only about 60m from substation sites. Additional noise in the surrounding area may be heard from generators in the substations, but these are fitted with silencers. This noise fluctuates on a daily basis, particularly the weekdays when vehicular use is at its peak in the vicinity. The noise level will however be maintained well within the guideline value for residential areas of between 35 ~ 40dB. Existing trees around the proposed substations that will not pose threats to the incoming or outgoing transmission lines will be left in place to act as noise buffer to would-be residents in the future and to road users. No further mitigation for generated noise from substations will be proposed.
4.2.3.4  Avifauna

Potential impacts by/on bird species present in the area associated with the construction and operation of a substation include electrocutions and disturbance during the construction and maintenance of the substation. Other problems include electrical faults caused by bird excreta when roosting or breeding on electricity infrastructure within the substation. Mitigating measures have been proposed for this potential impact which need prompt action.

4.2.3.5  Substation security and public safety

The substations are located in relatively built up area. Due to the voltages to be handled by the stations, it is important that they are made secured at all times and that unauthorized persons are kept away from the premises. The substations shall be suitably fenced to ward off persons from the premises. Padlocks shall be well maintained on the entrance to the substations. Also, security officers shall man the substations at all times to ensure security and report all incidents that might be out of the ordinary for prompt action. In addition, suitable warning signs indicating the dangers within shall be placed at regular intervals on the fencing to warn would-be encroachers.

A summary of the impacts is presented in the next page.
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<th>Socio-Cultural Environment</th>
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| Secure Access to RoW. Routes       | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 |
| Secure Access to Contractors Sites | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2+ | 0 |
| Clean up Substations               | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 |</p>
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<td>Air Quality</td>
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<tr>
<td>Transport equipment to site</td>
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<tr>
<td>Clearing RoW/Tower Route</td>
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<td>0</td>
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<tr>
<td>Excavating Foundations</td>
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<tr>
<td>Erecting Towers/Poles</td>
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<tr>
<td>Stringing Lines</td>
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<tr>
<td>Rehabilitating Substations</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Replace Cables/Conductors</td>
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### Activities

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<th>Activities</th>
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<th>Socio-Cultural Environment</th>
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<tr>
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<td>Land/Soil Degradation</td>
<td>Air Quality</td>
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<td>Testing and Commissioning</td>
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<td>EMF Effects</td>
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<td>Tower Maintenance</td>
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<tr>
<td>Substation Equipment Maintenance</td>
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</table>

**Key:**
- **0**  No potential impact or not significant
- **1** or **0/1**  Potential effect, or expected to be less significant
- **2**  Potential significant adverse impact
- **2+**  Potential significant beneficial impact
5. Impact Mitigation

5.1 Introduction

Impacts during the different phases of the project have been discussed in Chapter 4. Discussed below are some of the mitigation measures identified for the potential impacts during the pre-construction, installation or replacement of the poles and rehabilitation of the substations and operation phase of the project. The impacts identified that EDSA would need to be continuously monitored, and for which some technical assistance for improving EDSA’s monitoring capacities will be provided in this Chapter.

5.2 Mitigation during Pre-Construction Phase

The mitigation measures that would ameliorate impacts during the pre-construction stage would include sensitizing populations on the hazards posed by exposure to live power systems, such as electrocution, fires, EMG effects etc. On the environment side, prior to the erection of the poles, repairs of distribution lines and substations, adequate provisions shall be made for handling (segregating and classification) of wastes and their proper disposal or re-use where possible.

Noise from truck movements is transient and will not require special mitigation except to educate drivers to avoid unnecessary blaring of horns and revving of engines especially in the vicinity of residences.

Emissions from vehicles may contain pollutants such as CO, CO\textsubscript{2} and smoke, soot and other products of combustion. The quality of exhaust depends among other things on the state of maintenance of the engine. The contractor shall ensure that all vehicles used are properly maintained to avoid excessive air pollution.

Dust emission from haulage of sand shall be mitigated by ensuring that trucks carrying sand have suitable covering material such as tarpaulin in place. Damage to road surfaces and dust generation where roads are not paved is an unavoidable impact especially in the wet season.

Road accidents shall be minimized by ensuring that trucks are in good state of maintenance and that drivers are properly qualified and obey appropriate traffic signals. All materials being transported shall be suitably secured and trucks shall carry suitable warning signal such as “flashing amber light” and “red flags” on long items such as wood poles.

The clearing of the RoW, including the tower routes/spots involves mainly removal of unauthorized structures that are within the vertical clearance distance of 5m from the highest point on the ground to the conductor. Aside from housing and business structures, these cover
all trees and crops directly in the way of the lines. Spots for erecting towers shall be suitably cleared and graded during the rehabilitation of the existing lines.

5.3 Mitigation during Construction Phase

Exposure of soils to erosion and degradation from runoff shall be controlled by concreting the disturbed sites. As much as possible, the native ground cover beneath the lines shall be maintained. During the field surveys, it was noted that there were not many trees directly affected by the transmission lines. Some fruit and palm trees in way of towers will be affected. Poles that will be replaced on hill slopes will be highly prone to erosion and these shall be adequately protected by terracing or using stone cladding.

Noise from grading machinery is unavoidable, however the nuisance effect in residential areas shall be abated by ensuring that work is not carried out beyond the daytime working hours. Wherever possible, manual methods shall be employed in place of machinery.

The impact of loss of use of land and structures in the RoW by existing users will be addressed by the RAP consultant. The RAP consultant will provide the total number of persons and households that will be affected by the rehabilitation and repairs of the existing lines and who shall receive compensation and disturbance allowances. The avoidance of high-density slum settlements will be considered by diverting the lines RoW into less populated areas. Similarly, the consultant suggests that the Lumley substation which is located in a heavily populated area to be relocated to areas close to the Babadorie river.

From our discussions with the T & D Contractors, their scope is limited to replacing worn-out poles with new ones. Excavating foundations and erecting towers and poles involves works at selected spots where towers and poles are to be located. In the case of the wooden poles, existing poles will be replaced with new ones at the same spots. The distance between poles will be 70m apart for the 11 kV Line and for the LV Line, the distance will be 40m apart. The height of the poles for the 11 kV Line will be 12m and for the LV Line it will be 9m.

In the case of poles that will have to be replaced, this will involve some excavation. Typical excavation for erecting the poles will be up to 1,500mm deep and the trenches will excavate up to 600mm deep for underground cables. The soils dug out will be reused for backfilling.

Poles for the replacement works will have to be imported. EDSA will have to approve the manufacturer from which these poles will have to be imported. With this approval, T & D will place the order and before the poles arrive in Freetown, EDSA will either go and do an inspection of the poles and conduct some testing or the manufacturer can send test reports. However, EDSA has the option to employ both methods to ascertain that the poles are of good standards and the chemicals used for preservation of the poles are within the Stockholm Convention list of
chemicals that are not banned since Sierra Leone is a signatory to the Stockholm Convention on chemicals management.

In the case of the trenches that will be dug for the underground works, the contractor will disconnect cables that are obsolete and no longer to be used. In cases where the trench to be dug are of concrete nature, concrete will be used to resurface the areas dug. If it is asphalt surface that is dug, asphalt resurfacing will be done and if it was a surface that was of laterite, laterite shall be used to resurface the trench that will be dug. All old discarded poles, unused overhead materials and discarded underground cables will be handed over to EDSA for disposal or otherwise.

The erection of towers and new wooden poles will enhance the status of the electrical infrastructure in the transmission and distribution network, which is a beneficial impact. A further benefit is that of towers serving as perches for birds.

5.4 Mitigation during Operation

5.4.1 Storm Drains

Storm drain and flooding issues have become a serious problem in Freetown as a result of household and municipal waste (solid and liquid) been deposited into drainage channels in most parts of the Freetown Municipality. This practice often blocks the main drains in the city. Storm drain and flooding issues were evident during the ground trutting exercise of the consultant on the network of channels leading to the substations at the West African Monetary Authority (WAMA) Substation, Lumley Substation and the Brookfields Substation around the junction of Kingharman Road and Main Motor Road. The authorities at WAMA have purchased a water-pumping machine to empty the storm drain whenever there is a heavy down pour of rain.

The contractors for the substations (Lot 2) must ensure that the drainage network around the substations is isolated from the oil and fuel storage to ensure that the storm water is not contaminated with oil products prior to discharge.

5.4.2 Fire hazards

The best defense against fire outbreaks is to ensure they are not caused at all. From the field surveys conducted by the Consultant, fire out breaks was reported at Lumley Substation and Rawdon Street substation and along the line routes from Lumley to Wilberforce particularly during heavy rains and wind.

From the reports gathered in the field, fire outbreaks have often led to disastrous consequences. Measures therefore have to be put in place to ensure that fires do not break out in the substations.
Prior to the operation of the substations, and as part of project implementation, the in-house EDSA Safety and Fire Service must carry out a fire survey on the premises of each substation to identify specific firefighting equipment for the substations. These pieces of equipment must be installed at vantage positions within the substations in addition to the standard water hydrants and fire extinguishers provided for all the substations. This will ensure that substations remain in a high state of preparedness against potential fire outbreaks. In addition, pruning of tall trees and clearance of vegetation inside and outside substation must be done quarterly. Also, fire buffers must be created and maintained around the fencing to ensure that potential fires from non-insulated overhead cables and poles are not able to affect the substations and the poles.

5.4.3 Avifauna

EDSA must ensure that good housekeeping is done at all times in the substations. Bird nests in areas likely to cause electrical faults shall be promptly removed and transferred to nearby trees, if practicable.

5.4.4 Earthing of equipment

EDSA must ensure that there is adequate earthing of equipment to prevent shocks and malfunctioning of protection equipment.

5.5 Social mitigation

Evidence of possible resettlement issues have been mentioned in Chapter 4 dealing with environmental and social impact issues. A census of PAPs, inventory of structures shall be conducted and used to prepare a Resettlement Action Plan (RAP) to manage the displacement impacts of the project. The RAP will be designed to comply with the relevant land acquisition laws of Sierra Leone (e.g Public Lands Ordinance, CAP 116) and the World Bank Operational Policy on Involuntary Resettlement (OP 4.12) The RAP will specify measures – cash compensation, replacement of structures, skills training, and transitional assistance – that will be implemented to mitigate the impact of displacement on the PAPs. The RAP will be implemented prior to the clearing of the Right of Way (RoW) and commencement of works. This is particularly necessary especially around the Lumley Substation where population encroachment is heavy. A grievance redress mechanism (GRM) is recommended and shall function as a key mitigation measure for resolving disputes arising from impacts on communities. The scope of the GRM will include all receiving, investigating, and resolving all legitimate complaints about the project, both environmental and social.

The grievance committee will comprise the following representatives: Legal Adviser; EDSA Representative; Community Councillor (from FTC); Witness NGO – Representative; Representatives from the project affected communities; and a Community Elder.
A Chairman and a secretary have to be appointed to service the grievance committee. EDSA has to ensure that the committee’s functions are in place to receive all complaints. Meetings of the committee will continue to be held each month, at which all complaints or grievances are addressed.

The functions of the grievance committee are to:

(i) receive all complaints from aggrieved persons;

(ii) look into all complaints and internally resolve them amicably;

(iii) where the aggrieved person or persons remain dissatisfied, or the matter goes beyond the mandate of the committee, the Legal Adviser will advise on a resolution process;

(iv) make recommendations to the EDSA about issues from the RAP implementation and where impacts have led to conflicts; and

(v) Stand as a mediating force to manage all RAP conflicts.

In circumstances where the aggrieved person is still dissatisfied regarding the mitigation measures, the assistance of a private Lawyer, supported by EDSA, may be used to request for judicial resolution of the dispute. However, the grievances are first resolved through community leaders to reach an amicable settlement.

The continued disregard for the building lines and encroachments inside the RoW boundaries poses a risk to managing the Project’s impacts on affected communities. These impacts will be managed by:

(i) establishment of a social monitoring unit that periodically checks the RoW;

(ii) coordination with FTC, SLRA., Housing Department in the Ministry of Lands, Housing and Environment, the Police and National Security Office on enforcement of restrictions in the RoW; and

(iii) development of community-based self-monitoring systems for controlling the influx of households erecting illegal structures in the RoW and in and around the towers and substations.

CHAPTER 6
6.0 Public consultation and disclosure

6.1 Public consultation

Public consultations were done with reference to the World Bank safeguard policies on public consultation and disclosure (OP 4.01). Relevant and adequate project information was provided to stakeholders, proposed project-affected groups and Community Based Organizations (CBOs) to enable them to understand project risks, impacts and opportunities. Consultations started during the screening stage right through the assessment stage and environmental social management plan development stage.

6.1.1 Objectives of Public Consultation Process

Consultations play a major role in identifying the potential impacts of any proposed project and can assist in the identification of socio-economic, religious and cultural impacts. The main objectives of the consultation process undertaken are as follows:

- To provide information about the project and its potential impacts to those interested in or affected by the project, and solicit their opinion to that regard;
- To understand and address stakeholder concerns and expectations of the project;
- To manage any unrealistic expectations and address misconceptions regarding the project;
- To ensure participation and acceptance of the project throughout the lifetime of the project by the key stakeholders including the community;
- To provide a mechanism to address any stakeholder grievances regarding the project;
- Verify that their issues have been considered by the technical investigations.

6.1.2 Stakeholder Composition

The following interested and affected parties/stakeholders were consulted during the stakeholder consultation process:

- The Ministry of Lands, Housing and Environment
- The Freetown City Council (FCC)
- The SLRA
• Sierra Leone Telecommunication Company (Sierratel),
• CBO-Action for Environmental Protection and Sustainable Development (AEPSD)
• PAPs
• Community Chief/Headman
• Youths Leader

6.1.3 Informing Stakeholders to Participate

Letters of invitation for stakeholder participation were sent to all key stakeholders within and out of the community. Workshop where held and telephone calls with key stakeholders to inform other members about the proposed project. Few youth groups were also contracted to disseminate the information at selected RoW locations along the distribution lines and substations using Megaphones.

The following techniques were used:

• Key Informant Interview (KII);
• Focus Group Discussions (FGD).

Consultations done with stakeholders, project-affected groups and CBOs were participatory where PAPs were engaged in free, prior, and informed discussions. In achieving this:

• An appropriate gender strategy was established: local CBOs and local trade groups like bread seller organizations were also consulted;

• Along the distribution lines and substations, consultations were done in the local language (Krio) so that the stakeholders clearly understand the essences of the project and they are able to participate in the discussions with no limitation. Special attention was given to women and youths. Their views were captured and documented.

• During focus group discuss, the Environmental consultant would explicitly explain the background of the project, all other relevant information that they need to understand and possible environmental and social issues. All of these explanations were done in Krio.

6.1.3.1 Consultation with T&D Power Solution

Key issues discussed
The meeting was held at plot 5 off beach Road, Aberdeen the local office for T&D Power Solutions Limited - one of the contractors of the distribution lines (see Appendix with list of attendees). The ESMP consultant first highlighted the objectives of the ESMP where Antin Kumar Mandal who is the chief project manager of T&D asked if the ESMP work involved resettlement issues. Mr. Bendu was hasty to reply that the resettlement related issues will be handled by a Resettlement Action Plan (RAP) consultant. He further explained to the contractor what environmental social management plan is. During the discussions, the Mr. Mandal took out details of their line route and he also confirmed that T&D is not responsible for the rehabilitation and installation of substations. He mentioned that they are only responsible for the rehabilitation of the distribution lines which includes both underground and overhead and changing of poles where the need arises. Mr. Mandal further summarized their scope as:

a. Rehabilitation of 11kv overhead distribution lines;

b. Rehabilitation of 11kv underground distribution lines and;

c. Rehabilitation of Low voltage (LV) lines and;

d. Domestic and commercial re-connection types of poles.

The contractor took out copies of documents showing us details of overheads, underground and low voltage lines. He also highlighted the areas which survey work had been done and the areas that are still pending. From his presentation, 11kv overhead and underground are completed and the Low voltage lines are ongoing.

The ESMP consultant requested for the contractor’s EHS plan and document housing their operational procedure. Mr. Mandal replied that he will sought permission from the client and then asked him to write down all the documents and information needed for the ESMP.

Responding to concerns on their storage facility, the chief project manager of T&D noted that their store will be located outside of the city but did not mention the exact location. He further went on to say that the spacing and location of their store has not yet been finalized. The contractor also confirmed that his store will house wooding poles.

With respect to decommissioning of the existing underground cables that are faulty, he said they will be left underground but will just be disconnected permanently from the power source. He continued that removing old cables from the underground will not be prudent because it will attract lots of other costs, resettlement issues as many structures are erected along the route. Old poles, overhead cables and other things that will be replaced will be given to EDSA as they shall be stored at Kingtom.

Standard pole spacing and height of poles were outlined as:
• Pole distance for the 11Kv is 70 m on average;
• Pole distance for low voltage is 40 m on average;
• Height of poles for 11kv is 12 m;
• Height of poles for low voltage is 9 m;
• The depth of the pole is 1.5m average;
• The depth of the trenches for underground cable is 600mm on average.

The contractor mentioned that they will not be responsible for the treatment of the poles as it will be treated by overseas suppliers which EDSA shall approve. Poles shall be treated against insects following international best practice.

6.1.3.2 Consultation with Housing unit of the Ministry of Lands housing and the Environment

Key issues discussed:

The ESMP engaged Mr. Philip Farboh, a senior staff at the housing department. Mr. Bendu as usual narrated the ESMP’s objectives so as to help him understand the purpose of the consultation. Mr. Bendu requested to clarifications on RoW and the issuing of both temporal and permanent building permits. The ESMP consultant asked: “The city is expanding, commercial businesses are also expanding hence there is an urgent need for the upgrade of the electricity distribution to matchup with the rising demand therefore the housing unit have a role to play in protecting the infrastructure of the electricity supply and distribution system. So how much have the housing unit done to execute their role?” Mr. Philip Farboh responded that the housing department has not done much because of lack of coordination between housing unit and utility companies. He further stated that Freetown is divided into zones (East, West and central), some areas are planned with good street alignment while some are not properly planned like the slums he continued. Mr. Farboh stated reasons for the unplanned nature of some areas, as the violation of building regulations were people many people erect structures without the Ministry issuing building permits. He further mentioned that, though they have building inspectors to monitor the erection of structural units, a major challenge is that the housing department do not have the power to demolish illegal structures especially permanent structures unless there is a court order for demolition which takes time to be issued. The delay for the issuance of court order is a license for the proliferation of illegal structures all over the city Mr. Faboh said. He stated that the Freetown Improvement Ordinance (FIO) Cap 66 is the only statute guiding their activity more especially in planning. The FIO is also a guiding instrument as to how contractors and builders should go about putting up structures
6.1.3.3  Meeting with Freetown City Council

Deputy license officer

This meeting started with the ESMP consultant introducing himself to the deputy license officer who is Mariatu Bangura explaining the rational of the project and the benefit Freetown stand to gain. During the discussion the ESMP consultant pointed out to Mariatu Bangura that it is clear that the space left for utilities have been occupied by traders and many have erected permanent structures on these ROW and they do mostly capitalize on licenses her office do issue to them. In her response, she said that they only issue business license for business transactions in the municipality to construction companies, local restaurant (cookery shops), pharmacies, tailor shops, garages, factories, kiosk, cinema hall etc.

The ESMP consultant went on further to enquire if all of the licenses they have issued as a council are to business operating under distribution lines and on top of underground networks? Mariatu Bangura hastily responded that the FCC has no way to determine existence of these infrastructures, all they care about is payment for the license and making sure that your trade corresponds to the clearance you paid for. She went on further to state that the local government Act of 2004 guides them to raise revenue through license business people pay to council. She pointed out that license department do not give permits to build structures but permit to do business. From discussions with her, she is not aware of any collaboration between the council and the housing department of the Ministry of Lands housing and Environment and she finally recommended that we speak to the Environment department of the Freetown city council. Finally, the Environment consultant had to ask if they are aware of the distribution lines and substation upgrade in Freetown, but the deputy license officer responded that they are not aware of the project and that sensitization needs to be done by EDSA.

Environment Department

The ESMP consultant started with introduction of the energy sector utility reform project and updating him on our discussions with the license department. The environment and social officer at the council Sulaiman Zainu Parker confirmed that he is aware of the upgrade and he has been informed accordingly. During the consultation, Sulaiman Zainu Parker stated that they are governed by the local council Act of 2004 where the municipality starts from Orogoo Bridge to bottom Levuma. From consultation with other MDAs the issue of the RoW came out very clear as one of the problems utility institutions like EDSA are facing. Mr. Parker said the Municipality is the owner of the RoW and SLRA do manage the RoW because it forms part of the road asset as he put it. He further stated they do collaborate to issue temporal permits to business to build their temporal structure on the RoW.

Since the RoW is one of the Social and Environmental issues impacting on the project, the ESMP consultant had to ask if council is guided by any law to issues out permits for the use of RoW.
Mr. Parker stated that they are guided by the Local Government Act of 2004 as the issuance of building permits have been devolved to them. He pointed out that though issuance of permit is in the Act but the housing unit formally under the Ministry works housing and environment are still issuing permits, as their functions are conflicting with them.

During the consultation, public safety took center stage as the ESMP consultant outlined to the environment and social officer that some traders do build their kiosk very close to substations and under electric poles exposing themselves to high risks such as non-ionizing radiations (EMF), transformer blasts, fire etc. Mr. Parker responded that he is aware of the risks and if you really ask some of these traders, they will not be able to show any form of temporal building permit for their temporal structure. The business license is not a building permit but a transaction license which they normally display to legalize their illegality Mr. Parker said. Mr. Parker mentioned that this has been a challenge and he has written a letter to the head of business license to be consulting with his department before the issuance of such license so that his department inspects the location of the business if the location does not pose a threat to public health, environment and safety. He further mentioned that council is very concerned with respect to these illegal structures on the RoW and he was even pivotal in demolishing some of these structures for EDSA in 2017 at the Eastern part of Freetown. During the demolition in 2017, they had less confrontation because the occupiers of these structures are aware that they are illegal occupants. However, to mitigate the proliferation of squatter along the Row, license should not be given out by the license department without prior confirmation from the Environment and social department of the Freetown City council.

Finally, the environment and social officer stated that lately they were not collaborating with the housing department because they were with the understanding that parts of their core functions have been hijacked but since it has been relocated to the Ministry of Lands Housing and Environment they will shortly initiate collaboration.

6.1.3.4 Meeting with PAPs at Lumley Junction

1. Meeting with Lawrence Joe Vandy

Mr. Edward Bendu as usual stated the purpose of the consultation. Lawrence Joe Vandy who is a mobile recharge trader stated that he is not aware of the electricity distribution upgrade project and the ESMP consultant had to outline to him the danger his life is exposed to by sitting and doing business conveniently near a substation that is almost locked. Lawrence has a table, chair and a beach umbrella at the immediate front of the substation selling recharge cards for different mobile networks. When Lawrence was asked about the number of similar owners of such business he presides over he told us that there are roughly fifteen of such business at the immediate frontage of the substation. When he was asked how he gained title of the space he is doing business, he told the ESMP consultant that Ekudayo Alex Morgan normally called Mr. Obie gave him the space to aid his business transactions.
2. Meeting with Larry Morgan the younger brother of Ekudayo Alex Morgan (Mr. Obie)

A one on one meeting held with Larry Morgan who is the junior brother of Ekudayo Alex Morgan the manager and administrator of the structure left of the substation at the Lumley junction. The ESMP consultant asked Larry if he is aware that there is a substation adjacent their structure and also if he is aware that the substation is going to be upgraded and he answered in the affirmative. Mr. Bendu further outlined the risks residents very close to the substation are prone to. Larry pointed out that they respect the building line and RoW principles which prompted them to move 3ft off from the substation when putting up their structure He went further to state that they have legal title to the land from the edge of the Babadorie river to the Lumley junction and that the substation is presently on their Land because they have not seen any document showing how that piece of land was given to EDSA therefore they do not know the arrangement between their grandmother who their grandfather bought the land for from the Babadorie river to Lumley crab town junction with government. However, since it is a property of the GoSL and it is for the interest of the public they have no objection to it and they are willing to even give more space to EDSA for the extension or construction of a new substation at the back or further down which to him is the ideal place.

During discussions with Larry he stated that the Lumley junction substation is notorious for fire outbreaks and as a community they do normally extinguish the flame because they have fire extinguishers at their business places. They (the Morgan family) constantly remind occupants of shops to buy fire extinguishers he said. Mr. Morgan noted that in 2017 the transformer exploded and busted out into flames as the result of overloading. He recommended that this substation be relocated because of encroachment from the other side and lots of small business growing to reduce the high cost of relocation. With respect to the distribution line close to the ongoing construction, a verbal stop work notice was given during visit at the inception stage. Larry responded that he recommends EDSA to change all the naked cables to cables coated with insulating materials.

Larry took the consultant at the back of the substation showing a very spacious place he thinks the present substation should be relocated to. The topography of the proposed site is fairly flat with small back yard garden used for vegetable cultivation. Larry told the ESMP consultant that initially the place was used as a waste site but he managed together with his boys to clear the plastics and other wastes that were present initially. From the back it is crystal clear the fence of the substation is been shared by the other structure that did not respect the building line and spacing principles. Larry is enthusiastic about the upgrade.

3. Meeting with workers of Chernor Jalloh

The next adjacent house that is sharing fence with the substation was visited but the owner of the house was not around but the environment consultant spoke with him through the phone via one of his workers at the restaurant. From discussions with his staff and Chernor Jalloh on phone they
made it very clear that they are not aware of such moves by EDSA to upgrade the substation. He also mentioned that he is aware that the substation poses lost of environment and social challenges like, frequent transformer blast, eruption of fire, spark emanating due to collision of naked distribution lines when there is storm. Because he was on phone, he could not explain details of these incidents however, Mr. Bendu had to tell him to cooperate with the RAP consultant when she comes around.

4. Consultation with Potential Project Affected Persons (PAPs)

The ESMP consultant had spoken with Lawrence Vandy to organize a meeting, which comprises the chairman for the petty traders, his executives and traders that are occupying spaces under the distribution line and close to the substation. The meeting started with individual prayers and formal individual introduction.

The consultant started with the background of the project so that participants understand the essence of the project stressing on the bigger benefits. These participants made it very clear that whenever the wind blows a little without any rain the overhead cables start to blaze and in some cases, the cables do cut and fall on their beach umbrellas. The chairman of the bread seller said EDSA knows about the frequent blazing of the substation. From contributions given by these traders they all unanimously agreed that the cables should be replaced with insulated bundle conductor which should be similar to that used from Lumley Junction to regent road or should be changed from overhead to underground.

6.1.3.5 Meeting at Kingtom with the Substation Supervisor

The supervisor who is in charge of the substation Sallieu Maga Kamara is aware of the upgrade and was asked about the issues surrounding the substation that has environment and social bearings. He said the environment department under EDSA is responsible for the changing of transformer oils and he is only responsible to supervise the distribution of energy. There are two protection teams, the west team is responsible for the change and management of oil wastages in the West of Freetown and their office is at Falcon Bridge and the East team responsible for the change of oils in the East of Freetown with their office at Blackhall road.

He mentioned that electrical sparks at the Kingtom substation and along distribution lines are the order of the day more especially when it rains, storms, movement of birds etc. Mr. Kamara mentioned that on the 22nd of June this year, along line 161 back of the National Stadium the movement of birds along that route caused some sparks and eventually the cable was cut and fell down, also the high tension line also slashed on the 25th of June. He further mentioned that at Rokel village in the East end of Freetown, a tree fell on an 11Kv line on the morning hours of the 26th June and at Wilberforce one of the interconnectors on the main distribution line gave-off smoke.

During the discussion, he proffered ways he thinks these challenges will be resolved:
• Firstly, regular replacement of interconnectors as they presently have only three interconnectors at Kingtom that is from Jica, Stead and Brookfields I;

• Replace all bare wires and short poles more especially at Henneson Street Kingtom and along container routes. As he said they are always called upon by residents along these routes to turn off the light when containers are navigating along those routes because the poles are shorts and the wires are barred;

• Under sized conductors should be changed to prevent deem lights in certain areas;

• To change switches of secondary substation which was the reason for the blast at the substation at Safari Company; some of these switch dates back to 1964 when they were installed.

When he was asked about his knowledge of the emission of non-ionizing radiation that is Electric and Magnetic fields he was not able to answer because they do not have any means of checking.

6.1.3.6 Freetown 161

At the Freetown 161 primary substation, discussions were held with Osman K. Bangura who is the operations man at the station for EDSA. He also highlighted the same issues of trees falling on distribution lines whenever there is storm, cutting off high tension lines and issues of thunder, explosion of switch gears when the level of gas in transformers are low or at high temperature.

Mr. Bangura recommended that thunder arrestors should be installed on the lines and there should be regular cutting of trees along distribution lines. When he was asked on the type of oil they use, he mentioned that he is not responsible to change oil and he does not know the type of oil they use. He further said he is aware of non-ionizing radiation (EMF) but he does not have any instrument given to him by EDSA to check.

6.1.3.7 Meeting at Brookfields substation

Ali Turay, the supervisor at Brookfields substation responding to questions noted factors responsible for broken conductors as:

1. Loading i.e. load to specification which will result to power outage, accidental death when the conductor is slashed lying on the ground with current passing through it, and other electric hazards as results of slashed cable;

2. Size of the conductors; this is important because the size of the conductor determines the size of the load it carries;

3. Not upgrading to time with the expansion of new communities.
He also mentioned that the trees and birds do affect them but these are seasonal and they are working on tree cutting exercises together with the prevention and maintenance department at EDSA. He stated that they do not use oil presently in transformers and switch gears, he said they use SF₆(g). At the primary substation all are using gas and some of the secondary substations 90% are using gas and the remaining 10% still use oil he lamented. They do not refill gas switchgears as it is designed in such a way that the switch gear will depreciate as the gas levels drop. Mr. Turay finally mentioned that if the gas level goes below critical without changing the switchgear it will blast causing fires.

### 6.2 Disclosure Plan

Meaningful consultations were held between project-affected groups CBOs and relevant materials were disclosed to them in a timely manner prior to consultation in a form and language that are understandable and accessible to the groups being consulted.

The project document (ESMP document) will be brought to the public domain to give stakeholders to express their concerns and interests. Adequate notice will be given to these stakeholders about the day the Public Disclosure meeting will be held.

<table>
<thead>
<tr>
<th>No</th>
<th>Name</th>
<th>Institution/ Category</th>
<th>Designation</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mr. Phillip Farboh</td>
<td>MLHE</td>
<td>Senior Staff at Housing Department</td>
<td>+23276686121</td>
</tr>
<tr>
<td>2</td>
<td>Mariatu Bangura</td>
<td>FCC</td>
<td>Deputy license officer</td>
<td>+232030494491</td>
</tr>
<tr>
<td>3</td>
<td>Sulaiman Zainu Parker</td>
<td>FCC</td>
<td>Environment and Social Officer</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 3: List of Persons Contacted
<table>
<thead>
<tr>
<th></th>
<th>Name</th>
<th>Role</th>
<th>Contact Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Larry Morgan</td>
<td>PAP</td>
<td>Member of the Morgan family at Lumley Substation +23288235399</td>
</tr>
<tr>
<td>5</td>
<td>Chernor Jalloh</td>
<td>PAP</td>
<td>Owner of property adjacent to Lumley substation +23278705252</td>
</tr>
<tr>
<td>6</td>
<td>Lawrence Vandy</td>
<td>PAP</td>
<td>Trader +23230300663</td>
</tr>
<tr>
<td>7</td>
<td>Sallieu Maga Kamara</td>
<td>EDSA</td>
<td>Supervisor Kingtom substation +23278023416</td>
</tr>
<tr>
<td>8</td>
<td>Osman K. Bangura</td>
<td>EDSA</td>
<td>Operations Manager Freetown 161 +23277406786</td>
</tr>
<tr>
<td>9</td>
<td>Ali Turay</td>
<td>EDSA</td>
<td>Supervisor Brookfields substation +23277604001</td>
</tr>
</tbody>
</table>
7. Environmental Management, Monitoring Plan and Associated Costs

7.1 Introduction

This Chapter (Chapter 7) presents the Environmental Management, Monitoring Plan and associated costs for the Freetown Distribution System Rehabilitation (FDSR) Project under the Energy Sector Utility Reform Project (ESURP). It provides plans to minimize impacts arising from project activities and contains a list of pro-active measures that will address the potential impacts prior to their occurrence. It is a document that has to be used and consulted by all concerned parties and stakeholders during construction and operation phases. The success of any project lies in the hands of management as it is the focal point for decision taking and releasing the required financial resources. Management should therefore be convinced on the sensitivity of this undertaking and be fully committed to provide its support towards environmental stewardship.

EDSA management shall ensure that there is a technically and legally binding contract document between the contractor, all his sub-contractors, and the project management team of EDSA so that the mitigating measures, listed in this Plan, are mentioned into the contract document and it will ensure that the contractors strictly adheres to these conditions. Moreover, EDSA and the Contractors appointed for these works must have a competent environmental team that would conduct the day to day environmental monitoring of project activities and report to management on a regular basis.

7.2 Objectives of the Environmental Management Plans

Specifically, the plans are to:

- Define the environmental management responsibilities of EDSA within the project phases of pre-construction, construction, operation and maintenance, and commissioning;
- Outline a monitoring mechanism and identify monitoring parameters to ensure that proposed mitigation measures are fully implemented and managed, and
- Identify the resources required to implement the ESMP;

7.3 Environmental Management Plan

The matrix in the table below gives a summary of the environmental management plan and estimated costs. The overall implementation of this plan lies with EDSA. Various institutions will remain responsible for certain activities. EDSA shall remain accountable for ensuring that the

monitoring and corrective actions are implemented. The tables below do not include a column indicating who is accountable but rather who is responsible for a particular aspect.
## Table 4: Environmental and Social Management Plan

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Secure access to Distribution Line Routes, rehabilitation and construction sites;</td>
<td>- Loss of use of land along the Resistance from affected persons</td>
<td>- Control of encroachments into RoW;</td>
<td>- EDSA / ESMS</td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>- Public education and awareness campaign</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>* To be determined by EDSA</td>
<td></td>
<td>Quarterly checks</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- USD 2,000</td>
<td></td>
<td>Print and electronic media, workshops, FGDs</td>
</tr>
<tr>
<td>• Cleanup Substations.</td>
<td>- Waste generation</td>
<td>- Provide waste disposal site</td>
<td>Contractor</td>
<td>USD 3,500</td>
<td>Regular Inspections</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction Phase</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Transport Equipment to Site</td>
<td>- Noise, Dust, Air pollutants, Road Accidents</td>
<td>- Adopt best practices as necessary</td>
<td>EDSA/Contractor</td>
<td></td>
<td>Periodic monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Clearing RoW/line route</td>
<td>- Loss of use of land - Soil erosion, sedimentation and runoff</td>
<td>- Proper leveling and return land to its original form</td>
<td>EDSA/Contractor</td>
<td></td>
<td>Periodic monitoring</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Excavating Foundations and Erecting Poles on existing sites</td>
<td>- Waste generation - Health and Safety risks of workers assembling towers/poles</td>
<td>- Maintain native vegetation cover - replant disturbed sites - Personnel Safety equipment</td>
<td>EDSA/Contractor</td>
<td></td>
<td>Regular Inspection</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Stringing Lines and Replacing existing cables/conductors</td>
<td>- Visual intrusion - Waste generation - mostly metals, insulators, etc</td>
<td>- Segregate and dispose of wastes as appropriate - Improve alignment and tensioning</td>
<td>EDSA/Contractor</td>
<td></td>
<td>Regular Inspection</td>
</tr>
</tbody>
</table>

**Notes:**
- RoW: Right of Way
- EDSA: Environmental and Social Development Authority
- USD: United States Dollar
- FGDs: Focus Group Discussions
- Rehabilitation of Substation houses and Install new Transformers and Equipment.
  - Construction impacts (Storm Water, debris waste etc.)
  - Disposal of transformers and other items, oil leaks
- Personnel Safety equipment
  - Segregate and reuse, recycle or dispose debris as appropriate
  - Adopt safety procedures
  - Adopt best practice
- EDSA / Contractor
- Contract or’s costs
- Periodic inspection

<table>
<thead>
<tr>
<th>Operation phase</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maintenance of Vegetation Control</strong></td>
</tr>
<tr>
<td>- Loss of vegetation cover</td>
</tr>
<tr>
<td>- Loss of income from fruit trees</td>
</tr>
<tr>
<td>- Implementaion of an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs along RoW</td>
</tr>
<tr>
<td>- EDSA</td>
</tr>
<tr>
<td>- To be determined at the time of operation and maintenance by EDSA</td>
</tr>
<tr>
<td>- EDSA Prevention and Maintenance Department to regularly take action.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Line Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Waste generation</td>
</tr>
<tr>
<td>- Health and Safety of workers</td>
</tr>
<tr>
<td>- Segregate and dispose waste as necessary</td>
</tr>
<tr>
<td>- EDSA Safety rules and personnel protection</td>
</tr>
<tr>
<td>- EDSA</td>
</tr>
<tr>
<td>- As and when appropriate</td>
</tr>
<tr>
<td>- USD 1,000 for PPE</td>
</tr>
<tr>
<td>- EDSA Prevention and Maintenance Department to regularly take action.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Special Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMF</strong></td>
</tr>
<tr>
<td>Unknown health hazards</td>
</tr>
<tr>
<td>- Protect public/staff from equipment</td>
</tr>
<tr>
<td>- Public education</td>
</tr>
<tr>
<td>- Training</td>
</tr>
<tr>
<td>- ESMS/EDSA</td>
</tr>
<tr>
<td>- USD $5,000</td>
</tr>
<tr>
<td>- EDSA Prevention and Maintenance Department to collaborate with the Radiation Protection Agency, MoE to monitor for health effects and hazards</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PCBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Regular monitoring</td>
</tr>
</tbody>
</table>
| Use of SF6 equipment | Health hazard | - Safe handling Procedures  
- Personnel Protection  
- Training | ESMS/EDSA | USD 5,000 | ng of disposable oils containing PCBs.  
- Regular monitoring of staff performance. |
|----------------------|--------------|------------------------------------------------|----------|----------|---------------------------------------------------------------|
| Hazards Management   | Health hazards | - Safety disposal of transformers containing SF6.  
- Training in handling transformers containing SF6.  
Use of appropriate PPE | ESMS/EDSA | USD 2,500 | Regular checks and monitoring |
| Waste Management     | Health, Safety and Pollution hazards related to used oils, worn out parts from equipment, worn | - Training in waste management;  
- Appropriate PPE | ESMS/EDSA/Contractors | USD 2,500 | Regular monitoring in the effectiveness of staff performance |
| Transformer Oil Leaks | out poles and cables etc. | Pollution hazards Health and safety hazards | Construct bonds around transformers | ESMS/EDSA/Contractors | USD 1,500 | Regular monitoring in the effectiveness of staff performance |


7.4 Occupational Safety and Health issues

The contractor shall ensure that the guidelines proposed in their operational manual as well as this ESMP for the health and safety of workers together with the communities where they are operating are adhered to. EDSA management shall ensure that the availability and use of PPEs be periodically monitored during the construction, operational and maintenance phases. All employees who refuse to use the protective equipment provided shall be properly sanctioned. To ensure that personal protective equipment is always readily available, all defective equipment shall be promptly replaced. Regular safety tests as recommended by manufacturers shall be conducted on equipment such as cranes and winches.

7.5 Fire hazards

In order to prevent any outbreak of fire, construction work shall be monitored regularly to ensure that the execution of works is done strictly adhering to technical specifications relevant to electrical safety. The use of low quality components, inadequate sizing of cables and negligent execution of works and general non-observance of safety rules shall be monitored regularly.

7.6 Waste management

The management of wastes generated from insulating oils from transformers, worn out transformers, worn poles and cables etc shall be monitored periodically to ensure that the wastes are collected promptly and disposed of at appropriate public waste dumping sites. The cleanup of accidental spills of oil, fuel and paints whenever they occur shall be monitored to ensure that the cleanup is promptly and properly done.

7.7 Public/Worker safety

Occurrences of accidents involving distribution lines and structures that may affect public safety or worker safety shall be recorded whenever they happen, with specific notes on frequency and severity. This will eventually indicate whether additional mitigation measures are required to make the system safer.

7.8 Identification of project-affected persons and compensation payment

The RAP consultant shall identify PAPs and communities during his/her assignment. EDSA shall ensure adequate compensation packages to the PAPs.
7.9 Substations

During the operational phase of the project, the substations shall be managed regularly by EDSA to ensure that they comply with all regulatory requirements. Parameters to be monitored shall include the following:

7.9.1 Fire safety

The substations shall be managed regularly to ensure that all installed fire extinguishers and water hydrants are in good working conditions and that all extinguishers have been recharged as required by the Factories Act, 1974. The perimeter of the substations shall also be inspected to ensure that the vegetation barrier (fire buffer) created against fire is well maintained.

7.9.2 Storm drain around substations

Storm water being discharged from the network of drains at the substations shall be regularly inspected to ensure that storm water does not affect substations operation.

7.9.3 Noise

Operating noise levels of the substations shall be managed to ensure the levels do not go beyond the guideline limit values.

7.9.4 Occupational safety, health and welfare

The safety, health and welfare of the workers are of paramount importance to EDSA. Monitoring shall be carried out on occupational safety and health within the substations during their operational phase.

7.9.5 Personal Protective Equipment

The provision and use of personal protective gears shall be purchased and management shall monitor to ensure workers are well protected against the hazards of the workplace. The purchase of PPE is costed in the plan.
7.9.6 Good housekeeping

Management shall ensure that good housekeeping is maintained at all times on the premises. All weeds springing up through the stone carpet of the substations shall be monitored on a daily basis to ensure that there is always a firebreak at the perimeter.

The premises shall be monitored to ensure that potential nesting places of birds are kept free, as these are likely to cause electrical faults.

7.10 HIV/AIDS

There exists the likelihood of contacting and or transmitting HIV/AIDS by immigrant/workers in the various work localities. Education on the HIV/AIDS and the use of condoms shall be provided by EDSA and the contractors.

Even though this monitoring program could be useful, Contractors and EDSA shall ensure, through its educational program, that safe sex is practiced by the construction teams so that incidences of the diseases due to activities of the construction crew are prevented or minimized. EDSA should ensure that workers demonstrate responsible behavior in their interaction with local young girls, and avoid gender-based violence and sexual exploitation of local girls in all circumstances.

7.11 Possibility of Chance Finds

The possibility of discovering historic, cultural/archaeological finds during construction is limited under this project. This project involves the rehabilitation of existing structures (poles and substations) hence the consultant finds the possibility of chance find very limited. However, should they be found, a chance find procedure as described in Performance Standard 8 of IFC should be followed.

7.12 Contractor’s obligation and legal requirements

The contractors shall employ Environmental Health and Safety (EHS) officers who shall prepare their own safety plan prior to the commencement of construction works. The Contractor’s safety plan shall include, to the extent practicable, all steps to be taken by the Contractor to protect the environment in accordance with the current provisions of national environmental regulations, the World Bank Groups Environmental Health and Safety General Guidelines and the Environmental, Health and Safety Guidelines for Electric Power Transmission and Distribution, 2007 as well as the ESMP for this project.
7.13 Monitoring and Training Costs

In order to be effective, environmental monitoring must be fully integrated with the overall project management effort at all levels of the project activities. The project itself is aimed at providing a high level of environmental protection by developing a properly designed and constructed plan of activities that will function effectively throughout its life span.

The monitoring plans with their associated costs provides a framework for implementing the mitigation measures recommended and proffer cost estimates for plan implementation.
Table 5: Monitoring Plan for the Pre-construction, Construction, Operation and Maintenance Phases

<table>
<thead>
<tr>
<th>Issue</th>
<th>Objective</th>
<th>Monitoring and Training</th>
<th>Performance Target</th>
<th>Indicator</th>
<th>Responsible Party/Parties</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Construction</td>
<td>To ensure that staff are trained to understand and to appreciate the ESMP</td>
<td>Training session and programs organized for contractor’s staff and supervised to the satisfaction of EDSA Relevant Health, Safety and Environmental Policies as mentioned in chapter 2 of this document implemented.</td>
<td>Minimal breaches in this ESMP procedures</td>
<td>15 staff in the preventive maintenance Dept. trained in ESMP implementation.</td>
<td>ESMS/EDSA/Contractor</td>
<td>In house training at the EDSA training School, Kingdom</td>
</tr>
<tr>
<td>Foundation is laid for institutional strengthening and capacity building for ESMP implementation with regards to:</td>
<td>• Securing access to Transmission Line Routes, rehabilitation and construction sites; • Clearing of Substations.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Part of contractor’s cost.</td>
</tr>
<tr>
<td>Contractual obligations and environmental compliance</td>
<td>To ensure contractor complies with provisions of the ESMP</td>
<td>Suspension of project activities to ensure environmental mitigation measures are satisfactorily Implemented</td>
<td>Contractor’s EHS plan comprehensively covers all aspects</td>
<td>Contractor’s EHS plan submitted before mobilization of works.</td>
<td>EDSA/ESMS</td>
<td>Part of contractor’s cost.</td>
</tr>
<tr>
<td>---</td>
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<td>---</td>
</tr>
<tr>
<td><strong>Construction Phase</strong></td>
<td><strong>Air Quality</strong></td>
<td>To reduce the negative impacts of the dust emitted from material transport and construction works</td>
<td>Introduce spraying programs during digging of trenches for underground cable works and substation construction to reduce dust being emitted from these activities.</td>
<td>Reduced emissions from digging trenches and substation construction works</td>
<td>The particulate matter (PM) should be less than or equal to 1. $\text{PM}<em>{2.5}$ 50 $\mu\text{g/m}^3$ 2. $\text{PM}</em>{10}$ 100 $\mu\text{g/m}^3$ (IFC Standard 24hrs)</td>
<td>ESMS/EDSA/Contractor</td>
</tr>
<tr>
<td>Noise and Vibration</td>
<td>Minimize noise impact</td>
<td>Vehiches to be switched off when not in use; Regular maintenance of vehicles and machines to ensure silencing equipment are still effective i.e.</td>
<td>Machines and vehicles to be serviced according to vehicle, machinery and equipment handbook</td>
<td>Residential, institutional and educational (dBA 55 day time and dBA 45 night time). Industrial and commercial areas (dBA 70 day time and night time).</td>
<td>ESMS/EDSA/Contractor</td>
<td>Part of Contractor’s Cost</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>drilling machines, etc) exhaust fumes</td>
<td>Initiate dust fallout monitoring program to monitor efficiency of dust management measures</td>
<td></td>
<td>maintenance records</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task</td>
<td>Description</td>
<td>Criteria</td>
<td>.</td>
<td>Action by</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
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<td>----------------------</td>
<td>----------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Storm Drains</td>
<td>To reduce impact on storm drains due to digging and rehabilitation/construction of substations</td>
<td>Diversion of water from storm drains should be done following best engineering practices</td>
<td></td>
<td>ESMS/EDSA/Contractor</td>
<td>Part of contractor’s cost</td>
<td></td>
</tr>
<tr>
<td>Clearing RoW/Line route</td>
<td>To reduce loss of use of land, soil erosion,</td>
<td>EDSA to clear RoW from</td>
<td></td>
<td>EDSA</td>
<td>Cost to be determine</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Description</td>
<td>Outcome</td>
<td>Cost by</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Excavating Foundations and Replacing Poles   | To reduce on waste generation, health and safety risks of workers replacing poles | Replant disturbed vegetation cover/disturbed sites and workers to have Personnel Safety equipment during work hours | Contractor |}

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
<th>Outcome</th>
<th>Cost by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stringing Lines and Replacing existing cables/conductors</td>
<td>To ensure an effective segregation and disposal of wastes, alignment and tensioning of cables.</td>
<td>Segregate and dispose of wastes as appropriate. Improve alignment and tensioning. Contractors to take adequate steps to</td>
<td>Contractor</td>
</tr>
<tr>
<td>Rehabilitation of Substation houses and Installing new Transformers and Equipment.</td>
<td>To reduce construction impacts, ensure safe disposal of transformers and other items, and eliminate oil leaks.</td>
<td>Personnel Safety equipment; Segregate and reuse, recycle or dispose as appropriate; Adopt safety procedures; Adopt best practice.</td>
<td>Satisfactory implementation of construction works and installing of transformers and equipment.</td>
</tr>
</tbody>
</table>

**OPERATION AND MAINTENANCE**

| Vegetation Control | To reduce the loss of vegetation cover | Monitor RoW for encroachment s and ensure Successful implementati on of the programme of Quarterly pruning of trees and clearing of | ESMS/EDSA Prevention and Maintenance Dept | To be determined | ESMS/EDSA Prevention and Maintenance Dept | To be determined | ESMS/EDSA Prevention and Maintenance Dept | To be determined | ESMS/EDSA Prevention and Maintenance Dept | To be determined |

ensure stringing does not impact the roofs by climbing on them
| Line Maintenance | To reduce waste generated, health and safety issues | Training of staff in the Prevention and Maintenance Dept of EDSA | Successful maintenance of Line Route. | Quarterly pruning of trees and selective removal of vegetation along the underground route. | ESMS/EDSA | To be determined |

**SPECIAL ISSUES**

<p>| EMF | To reduce if not eliminate health hazards | Routine inspection to identify hazards and potential hazards by Health and Safety Dept of EDSA | Adequacy of training and public education | Health and safety record of workers | EMF frequency of 50HZ (Electric field: 5000V/m; Magnetic field: µ/T 100) | EMF frequency of 60HZ (Electric field: 6150V/m; | ESMS/EDSA | USD5,000 |</p>
<table>
<thead>
<tr>
<th>PCBs</th>
<th>To reduce if not eliminate health hazards</th>
<th>Routine inspection to identify hazards and potential hazards by Health and Safety Dept of EDSA</th>
<th>Successful handling of equipment with PCBs</th>
<th>Appropriate storage, decontamination and disposal of PCBs.</th>
<th>ESMS/EDSA</th>
<th>USD 5,000</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of SF6 equipment</td>
<td>To reduce if not eliminate health hazards</td>
<td>Routine inspection to identify hazards and potential hazards by Health and Safety Dept of EDSA</td>
<td>Successful handling of equipment with SF6</td>
<td>Appropriate storage, decontamination and disposal of transformers with SF6s.</td>
<td>ESMS/EDSA</td>
<td>USD 2,500</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Hazards Management</td>
<td>To reduce if not eliminate health and safety Hazards</td>
<td>Routine inspection to identify</td>
<td>Successful implementation</td>
<td>Appropriate storage, decontamination</td>
<td>ESMS/EDSA/Contractors</td>
<td>USD 2,500</td>
</tr>
<tr>
<td>Waste Management</td>
<td>To reduce the generation of waste, health, Safety and pollution hazards</td>
<td>Routine management of waste generated</td>
<td>Successful implementation of waste management programs</td>
<td>Quarterly submission of waste management report.</td>
<td>ESMS/EDSA/Contractors</td>
<td>USD 1,500</td>
</tr>
</tbody>
</table>
| Transformer Oil Leaks | To reduce pollution hazards, health and safety hazards from potential transformer oil leaks | Routine inspection to monitor leaks from transformers  
Training in handling of transformer oils  
EDSA Environment Officer to monitor transformer oil leaks | Successful implementation of monitoring plan for controlling transformer oil leaks | Submission of quarterly reports of transformer oil leaks. | ESMS/EDSA | USD 1,500 |
7.14 Monitoring Plans

7.14.1 Noise Monitoring Plan

Noise monitoring should be undertaken by EDSA throughout the life cycle of the project and EDSA has to have a competent Environmental Officer who possesses both the qualifications and experience appropriate to perform the required measurements and reporting.

A report must be compiled weekly or depending on the intervals of the monitoring programme then submitted to management to ascertain compliance with the required standards. Management should be advised of any significant increase of the ambient sound levels as operations continue. The ambient noise levels will be sampled in terms of the following parameters:

- The A-weighted equivalent sound pressure level (LAeq) for duration not less than 30 minutes per monitoring point; and
- Measurements to be taken during both daytime (06:00 to 22:00) or as appropriate.

7.14.2 Air Quality Monitoring Plan

Based on the predicted impacts on the surrounding environment, it is recommended that a dust fallout monitoring network be established on a continuous basis. Spraying of dust point sources be done and records kept to inform EDSA Management on fallout measures to reduce impact of dust on the surrounding environment. The dust fallout monitoring can serve to meet various objectives, such as:

- Compliance monitoring
- Use as input for health risk assessment
- Assist in source apportionment
- Source quantification
- Tracking progress made by control measures.

7.14.3 Waste Management Monitoring Plan

A waste management monitoring plan is proposed throughout the operation and closure of the project. The objectives of the monitoring programme include:

- To identify areas and sources of waste generation
- To submit samples of waste generated for contractor and management decisions
- To report on the compliance of the methods of waste disposal
- To determine the dynamics of waste containment and disposal movement.
The aims of the monitoring is to assess whether any impacts are occurring to the public and the environment, either as a result of pre-construction, operation and maintenance and closure or as result of any contamination by the activities of the project’s operations, and then make recommendations for mitigation or remediation of any sources of contamination, if identified.

7.14.4 RoW Monitoring Plan

Based on the activities of the project along the RoW, it is recommended that monitoring be done to ensure effective implementation of project activities along the RoW. The RAP Consultant is collecting data on PAPs and this data has to be supplied to EDSA and the Contractors for informed decisions on project works. The objectives of the monitoring programme include:

- To obtain levels of encroachment along the RoW and the substations
- To submit the encroachment data for comprehensive compensation and resettlement
- To report on the compliance of EDSA with World Bank, EPA Regulations and IFC on resettlement and compensation
- To implement decisions of the Grievance Redress Committee

A fair description of the encroachment on the RoW and the substations has been provided by this ESMP. A monitoring network should therefore be created to prevent further encroachment as this will aid smooth implementation of project works along the RoW and the substations.

7.14.5 Health and Safety Monitoring Plan

Based on the potential impact of the project on health and safety of workers and the public, a Health and Safety Monitoring Plan is recommended. The objectives of a monitoring plan include:

- To identify health and safety issues as they emerge during the project life
- To identify areas and sources of health and safety issues
- To recommend training packages for the handling of equipment with containing SF6, PCBs
- To determine source points for EMF effects

7.14.6 Monitoring Budget

Table 6 provides details of the monitoring budget. This is based on the assessment of the manpower required, patrols by the ESMS and EDSA Preventive and Maintenance Department and the frequency of monitoring.
<table>
<thead>
<tr>
<th>Monitoring Activity</th>
<th>Responsible Entity</th>
<th>Monthly Cost (USD)</th>
<th>Estimated Cost for Year</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise Monitoring Plan</td>
<td>ESMS/EDSA/Contractors</td>
<td>200</td>
<td>2,400</td>
<td>EDSA/ESMS</td>
</tr>
<tr>
<td>Air Quality Monitoring Plan</td>
<td>ESMS/EDSA/Contractors</td>
<td>200</td>
<td>2,400</td>
<td>EDSA/ESMS</td>
</tr>
<tr>
<td>Waste Management Monitoring Plan</td>
<td>ESMS/EDSA/Preventive and Maintenance Department/Contractor</td>
<td>1,000</td>
<td>12,000</td>
<td>Costs include data collection and logistical cost.</td>
</tr>
<tr>
<td>RoW Monitoring Plan</td>
<td>ESMS/EDSA/Preventive and Maintenance Department/Contractor</td>
<td>350</td>
<td>4,200</td>
<td>Costs include data collection and logistical cost.</td>
</tr>
<tr>
<td>Health and Safety Monitoring Plan</td>
<td>ESMS/EDSA/Contractor</td>
<td>1,000</td>
<td>12,000</td>
<td>Costs include data collection and logistical cost.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$33,000</td>
</tr>
</tbody>
</table>
CHAPTER 8

8.0 Closure Plan

8.1 Specific Closure

The project Manager and the Environmental Health and Safety manager will be responsible for the implementation, monitoring and the continuous improvement of closure and abatement plan. The rehabilitated substations and distribution lines are expected to have an operational life span of at least 25 years. However, it is anticipated that transformers, switch gears, cables poles and ancillary facilities will be replaced with new ones as and when required. After 25 years, the option will exist to continue to apply for clearance to continue to operate, to replace the transformers and ancillary facilities with more up to date technology or to decommission the entire infrastructure. Therefore, the lifespan of the proposed development is potentially indefinite.

No detailed closure/decommissioning phase is therefore proposed. The following management control measures are required if and when the infrastructure ceases operation:

a. All components (including transformers, switch gears, poles, cables etc.) are to be dismantled and removed from site preferably for reuse elsewhere or alternatively, for recycling of materials; and

b. Infrastructure associated with the development (e.g. buildings, land) which has no immediate use or value to EDSA, must be decommissioned and the property rehabilitated to EDSA’s satisfaction.

8.2 Monitoring

Closure and post closure monitoring will document the progress of the closure efforts. The elements of closure and post closure monitoring programs will include the following:

- Confirm the long-term stability of power availability;
- Evaluate the success of underground cables, over-head cables, switch gears, transformers, poles as measurement tools;
- Access the adequacy and performance of substations and distribution networks;
- Demonstrate that the quality of storm drainages are met
- Evaluate the success of previous training programs as measurement tools.

Closure and post closure monitoring and control programs will be conducted twice per year (dry and wet seasons) for a period of two years after closure has been completed. In the event that
deficiencies in the system are identified, appropriate mitigation measures will be taken to correct these deficiencies.

Monitoring will include visits to sub stations reconnaissance along the distribution network. Monitoring will also be used to identify areas that may require further improvement.

8.3 Implementation Schedule and Cost

8.3.1 Closure and reclamation Schedule

In general, site reclamation will begin immediately following decommissioning of the project infrastructure. Upon completion of final closure and reclamation, sites will also be monitored for a two-year period to evaluate success.

8.3.1 Financial Provision

The assessment of closure cost involves the quantification of infrastructure components and applying rates to rehabilitate each component. A financial provision will be set aside in a dedicated fund for closure and rehabilitation purposes. The costing must be reviewed on an annual basis for the duration of the closure phase to ensure that financial provision is sufficient for effective rehabilitation of the identified sites.

The following assumptions have been made for the closure costing.

- Demolition workers will have to be contracted within Sierra Leone and the rate charged for demolition should reflect this;
- A reputable earth works contractor should be engaged for the earth works aspect of the closure exercise;
- Rehabilitation of various sites will be carried out progressively;
- Provision should be made for monitoring and project management and allowance made for contingencies

A life of project closure cost assumes effective rehabilitation or remediation of relevant impacts on the environment and the surrounding community. At this stage, closure cost, if closure happens, it will be determined by EDSA.
### 8.4 ESMP Budget

<table>
<thead>
<tr>
<th>No.</th>
<th>ACTIVITY</th>
<th>INTERVENTION PLAN</th>
<th>Cost TOTAL (USD)</th>
<th>Responsible ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mitigation</td>
<td>• Site preparation</td>
<td>2,000</td>
<td>PIU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Construction</td>
<td>-</td>
<td>Contractor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operations</td>
<td>18,000</td>
<td>EDSA</td>
</tr>
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<td>2</td>
<td>Environmental and Social Monitoring</td>
<td>• Noise</td>
<td>2,400</td>
<td>PIU</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Air quality</td>
<td>2,400</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Waste</td>
<td>12,000</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RoW</td>
<td>4,200</td>
<td>&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Health and safety</td>
<td>12,000</td>
<td>&quot;</td>
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<tr>
<td></td>
<td>ESURP-PIU/HSE-Substations</td>
<td>Capacity Building</td>
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<td></td>
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<tr>
<td>---</td>
<td>-------------------------</td>
<td>------------------</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Training on the ‘Handling and clean ups of PCB contaminated materials</td>
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<td>PIU</td>
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<tr>
<td></td>
<td></td>
<td>Environmental Monitoring</td>
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</tr>
<tr>
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<td></td>
<td>Environmental Audit</td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td>PCB detection and Disposal Procedures</td>
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<tr>
<td></td>
<td></td>
<td>On the Job training for each substation HSE Officer.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Provision of protective wears (Hard hats, safety gloves, Ear Muffs, Nose muffs).</td>
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</table>

| Grand Total | USD | 63,000 |
### Table 7: Implementation Schedule

<table>
<thead>
<tr>
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<th>Task Name</th>
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<tr>
<td>1</td>
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<td>Import Data</td>
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<tr>
<td>2</td>
<td></td>
<td>Site Preparation</td>
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<tr>
<td>3</td>
<td></td>
<td>Construction</td>
</tr>
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<td>4</td>
<td></td>
<td>Operation</td>
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<tr>
<td>5</td>
<td></td>
<td>Decommissioning</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Environmental and social monitoring</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Climate</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Noise</td>
</tr>
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<td>9</td>
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<td>Air quality</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Waste</td>
</tr>
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<td>11</td>
<td></td>
<td>Health and Safety</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>MTC-PMC Capacity Building</td>
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<tr>
<td>13</td>
<td></td>
<td>Handling and cleanup of MCR contaminated materials</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td>Environmental Monitoring and Monitoring</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>Executive Tasks</td>
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<tr>
<td>16</td>
<td></td>
<td>Data Screening Techniques</td>
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<tr>
<td>17</td>
<td></td>
<td>MCR Detection and Diagnosis Procedures</td>
</tr>
<tr>
<td>18</td>
<td></td>
<td>Water: Water and dissolved trace elements Testing</td>
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<tr>
<td>19</td>
<td></td>
<td>Air: Trace Elements and Dissolved Trace Elements Testing</td>
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<tr>
<td>20</td>
<td></td>
<td>Sediment: Trace Elements and Dissolved Trace Elements Testing</td>
</tr>
<tr>
<td>21</td>
<td></td>
<td>Noise: Measurement and Analysis for Noise &amp; Vibration</td>
</tr>
<tr>
<td>22</td>
<td></td>
<td>Environmental Audit</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>Data Screening Techniques</td>
</tr>
<tr>
<td>24</td>
<td></td>
<td>EPC Accommodation and Property Development</td>
</tr>
</tbody>
</table>

---
9.0 CONCLUSION

The Energy Sector Utility Reform Project (ESURP) has come at the right time to improve on the Freetown Electricity Infrastructure System. EDSA has a very huge task considering the rising demand for electricity in Freetown against a backdrop of an electricity infrastructure and distribution network that had almost broken down after long periods of neglect. The project will upgrade the distribution lines, reduce losses in electricity supply to Freetown, and improve commercial performance of EDSA. The cost of the project is US $ 40m. The effective date of the project was 15th December, 2014 and the end date is 31st August, 2020.

The upgrade may, however, trigger some environmental and social impacts. EDSA, as discussed in this ESMP, shall take all necessary measures to mitigate these impacts. The benefits this project will enhance the overall electricity distribution and supply system and this will go a long way to contribute to the socio-economic development of the residents of Freetown and by extension the country as a whole. The replacement of wooden poles will enhance the status of the electrical infrastructure in the transmission and distribution network, which is a beneficial impact.

An Environmental Management, Monitoring Plan has been provided in this ESMP. The plan is intended to minimize impacts arising from project activities and contains a list of pro-active measures that will address the potential impacts prior to their occurrence. The ESMP has to be used and consulted by all concerned parties and stakeholders during construction and operation phases.

The success of this project lies in the hands of EDSA management as it is the focal point for decision taking, releasing the required financial resources and monitoring project activities. EDSA Management should therefore be convinced on the sensitivity of this undertaking and be fully committed to provide its support towards the success of the project and environmental stewardship when implementing this project.
REFERENCES

1. The Constitution of Sierra Leone, 1991
2. The National Environmental Policy (NEP), 1994
4. Prohibition of Ozone Depleting Substances Regulations, 2010
8. The Sierra Leone Electricity and Water Regulatory Commission
9. Sierra Leone Roads Authority (amendment) Act, 2010
10. Public Lands Ordinance, Cap 116,1808
11. Unoccupied Lands Ordinance, Cap 117,1911
12. The Protectorate Land Ordinance, Cap 122, 1927
14. Factories Act, 1974
15. Local Government Act, 2004
16. 2015 Population and Housing Census
17. World Bank Operational Policies (OP 4.01) January, 1999 (Revised in 2013)
20. World Bank’s Operational Policies on Environmental Assessment (OP4.01),
Annex 1: Meeting with staff of Housing Dept., MLHE

<table>
<thead>
<tr>
<th>Name</th>
<th>Designation</th>
<th>Tel. No.</th>
<th>Signature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abass Filla-Fasse</td>
<td>Chief K. Inсп.</td>
<td>076686121</td>
<td>A. A.</td>
</tr>
<tr>
<td>Tony Bakary</td>
<td>Proj. Director</td>
<td>076350382</td>
<td></td>
</tr>
<tr>
<td>Kai Tsawya</td>
<td>Planning</td>
<td>076647376</td>
<td></td>
</tr>
<tr>
<td>Maman Vandi</td>
<td>Civil Engineer</td>
<td>0764113575</td>
<td></td>
</tr>
<tr>
<td>Tamba Ngirba</td>
<td>Building Inspector</td>
<td>076527878</td>
<td></td>
</tr>
<tr>
<td>I. Mayriatu Jeconna</td>
<td>Deputy Licencce</td>
<td>080494491</td>
<td></td>
</tr>
</tbody>
</table>

Meeting with the Country Planning and Housing Dept., MLHE
Date: 24/6/2018

Freetown City Council
Annex 2: Meeting With T&D

1. Action Items:
   - Demand Statement:
     - Confirm dates
   - Head - FSM Control Lead

2. Action Items:
   - Project Manager - T&D Manager, FSM Controller

Meeting with the T&D managers.

[Signature]

[Date] 6/1/18
Annex 3: Meeting with Lumley Junction Traders

Meeting with Lumley Traders 4/6/18

1. Simon Severe - Trader
   076-701363

2. Abdulai Kamara - Trader
   079-319191

3. Marie Malick Kandeh
   097-817264

4. Fru Yampany - Trader
   076-629979

5. Ahun Furey - Trader
   Child Board
   Fellow
   077812163
6. Lawrence J. David
   030-300663
   Trader

7. Michael Freeman
   Trader
   096-525402

8. Paula Long
   Trader
   030-761222

9. Michaela Kays
   Trader

10. John Confer
    (Merri) Trader
    099-872743
Annex 4: Map showing Overhead from 161 to Soldier Street
Annex 5: Map Showing Overhead routes from Falcon Bridge to Substation
Annex 6: Meeting with the RAP consultant
Annex 7: Lumley Substation Site
Annex 8: Meeting with T&D Power Solutions Limited
Annex 9: Consultation with potential PAPs at Lumley Substation Site
Annex 10: Consultative meeting (EDSA PIU Contractors, RAP team and ESMP team)
Annex 11: ToR

GOVERNMENT OF SIERRA LEONE
Ministry of Energy

ENERGY SECTOR UTILITY REFORM PROJECT

TERMS OF REFERENCE FOR
Consulting Services for the Preparation of an Environmental and Social Management Plan (ESMP) for (Individual Selection)

Reference No. To be determined by STEP Process

1 Background

The Government of Sierra Leone (GoSL) has secured credit from the World Bank to implement the Energy Sector Utility Reform Project (ESURP). The main objective of ESURP is to upgrade the distribution lines, reduce losses in electricity supply to Freetown, and improve commercial performance of EDSA. A PMU (headed by a Project Coordinator) at the Ministry of Energy (PMU) is providing Technical Assistance to EDSA to implement a component of the ESURP project. That component involves the rehabilitation of selected 11kV substations and distribution lines in Freetown. Two Contractors have already been procured to implement the rehabilitation works as follows:

- Lot 1: Supply and Installation of 11kV and Low Voltage Distribution Networks in selected locations in Freetown. This involves the replacement of existing Low Voltage lines and conversion of some underground cable lines to overhead lines.
- Lot 2: Refurbishment of existing 11kV substations at Kingtom, Congo Cross, Brookfields, Falcon Bridge and Freetown 161kV and Construction of new 11 KV Switching station complete with control building at Lumley Junction

Based on the scope of works, it is expected that the implementation of the structural components of the project may extend moderate adverse environmental and social impacts on the immediate natural and social environment of the project. These impacts are largely expected to be limited and site specific. During the project preparation, an Environmental and Social Management Framework (ESMF) was prepared and disclosed to project stakeholders. The framework sets out the government’s legal framework and the general procedures for assessing and addressing adverse impacts that may be associated with the project.

Initial site assessment and screening indicates that the works will result in temporary moderate environmental and social impacts along the route of the power distribution lines and substations. To mitigate these impacts, EDSA intends to; (i) design and implement an environmental and social management plan for mitigating environmental and social impacts; and (ii) based on the ESMF, conduct an initial screening of the rehabilitation works, and (iii) using the results of the screening, conduct an Environmental and Social Management Plan outlining the key issues and material
measures to address adverse project impacts. To this end, EDSA is seeking the services of an individual to undertake key tasks that are necessary for achieving the above-itemized activities. This Terms of Reference sets the basis for the engagement of a consultant to prepare an Environmental and Social Management Plan (ESMP).

EDSA is in parallel procuring the services of another consultant to prepare Abbreviated Resettlement Action Plan (ARAP) and it is expected that the selected ARAP consultant would collaborate with the ESMP consultant.

2. Scope of Work

As part of this assignment, the consultant will (i) conduct (in collaboration with EDSA) initial assessment/screening form for the rehabilitation project to identify and characterize project impacts, (ii) initiate consultations with PAPs and other relevant stakeholders based on results of the initial assessment/screening, (iii) prepare environmental and social management plan that is proportionate to the impacts and is consistent with the environmental protection agency laws and regulations of Sierra Leone and the World Bank’s operational policy on environmental assessment (OP4.01).

3. Key Tasks/Work Program

At the minimum, the ESMP shall include detail identification and description of the following:

1. Project Background: An overview and general description of the rehabilitation of selected power substations and distribution lines in Freetown and affected areas. The section will also explain the rationale for the ESMP.

2. Objectives of the ESMP: The main objectives of the environmental and social management plan, proportionate to the nature and scale of impacts anticipated during the rehabilitation of sub stations and distribution lines.

3. Description of project environment and Potential Impacts: Identification of the: (i) components or activities that may extend environmental and social impacts; (ii) zone of impact of components or activities; (iii) project alternatives considered to avoid or minimize environmental and social impacts; and (iv) mechanisms established to minimize impacts, to the extent possible, during project implementation.

4. Potential impacts and Benefits enhancement and mitigation measures: This should describe the beneficial/positive impacts, adverse impacts and mitigation measures (line route and substations), impacts on communities/PAP and cumulative impact assessment.

5. Environmental management and monitoring program: The environmental management plan should describe the range of environmental issues associated with the project and
outline corresponding management strategies to be adopted to mitigate potential adverse environmental effects. This section will also provide guidance for the responsibilities for the implementation of mitigation measures at every stage as well as the monitoring indicators and reporting timelines specifically for the contractor and the project. Describe environmental management, monitoring and monitoring framework.

6. **Public consultations and disclosure plan:** Consistent with the World Bank’s policy on consultation and disclosure, describe a strategy for consultation with, and participation of PAPs, communities and project interests including EDSA’s in proposed project and its potential impacts identification and summary of consultations. This section should also describe the methods used throughout consultations and disclosure and major findings of consultations.

7. **Environmental mitigation, management, monitoring and training costs:** Budget for the implementation of the Environmental and Social Management Plan including any training and capacity building measures that may be required should be described in details in this section

8. **ESMP implementation responsibilities:** indicate the responsibilities assigned to various agencies and EDSA officials. These responsibilities should cover (i) role of the contractor and delivery of contractors ESMP; (ii) appropriate coordination between agencies and jurisdictions involved in ESMP implementation

9. **Implementation Schedule:** an implementation schedule covering all ESMP activities from preparation, implementation, and monitoring and evaluation. These should indicate the target dates for delivery of specific activities linked to the rehabilitation and distribution project.

10. **Costs and budget:** provide detailed (itemized) cost estimates for all ESMP activities. The estimates should be adjusted against inflation and other contingencies. The cost of the implementation of the ESMP would be borne by the contractor and accounted for in the contractor’s ESMP. This section will also include arrangements for timely flow of funds, and fiduciary considerations that are consistent with the Sierra Leone’s financial management and World Bank fiduciary requirements.

4. **Timetable and outputs**

The consultancy is expected to take 5 weeks to complete. The Consultant is expected to submit to the Project Coordinator of Energy Supply Utility Reform Project the following:
• Inception report describing the procedures and timetable for completion of the ESMP preparation process (one week after contract signing);
• Inception report should also summarize the preliminary results of the screening and consultation process with PAPs and other stakeholders (one week after contract signing); and
• Draft ESMP report (two weeks after contract signing).
• Reviewing of Final Draft by the client and the World bank - (one week after receiving comments).

After completion of the review of the draft ESMP, including consultations with PAPs and communities on the main finding of the ESMP, a final ESMP will be disclosed by EDSA. During the review process, the Consultant is expected to make the necessary changes to the ESMP and organize the disclosure and consultation process. The consultant will be paid the final fee after all the comments provided by the client have been resolved.

5. Qualifications of the Consultant

• A Senior Environmental Scientist or Natural Resources Specialist with at least 8 years of relevant experience, with emphasis on environmental and social impacts assessments in urban setting.
• The Consultant should have proven experience with World Bank Safeguards Policies and requirements.
• Must have been involved in at least two assignments for the preparation of ESIA/ESMP.
• Demonstrable experience in preparing ESIA/ESMP studies in the energy sector in the sub region would be an advantage.

6. Period of the Assignment

It is expected that three man weeks over an implementation period of 1 month shall be required.

7. Facilities to be provided by Client

The client will provide the following facilities to the consultant:
   a. Office accommodation when in Sierra Leone
   b. The approved RPF/ESMF
   c. Local transportation when in Sierra Leone and conducting field work
   d. Any other facility needed for the timely implementation of assignment
**ANNEX 2: ESMP Screening Form for ESURP**

Serial No: ..........................

**ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT SCREENING FORM**

Please respond to these questions to enable the consultant complete this form in its entirety. You may provide additional information and the interviewee will note these down on separate sheet of paper if necessary. Kindly note that the information you are to provide is voluntary but you should note that your response will make the report comprehensive.

**SECTION 1: INFORMATION ON THE CONTACT PERSON/GROUPS**

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<thead>
<tr>
<th>Name</th>
<th>Residential Address</th>
<th>Business Title/position</th>
<th>Business Address</th>
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<th>Email</th>
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**SECTION 2: DESCRIPTION OF THE SUBSTATION/FACILITY**

<table>
<thead>
<tr>
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Date of visit to the Substation

Location of Primary Substation

Location of Secondary Substation

SECTION 3: VIEWS OF STAKEHOLDERS ON THE BENEFITS OF THE PROJECT

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<th>NEGATIVE</th>
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</tbody>
</table>

SECTION 4: DESCRIPTION OF THE PROJECT ENVIRONMENT

Land Use

Current land Use (Describe how the land is being used at present)

Brief description of the biophysical and socio-economic environment of the project’s location.
Describe other types of industries or facilities (including health centers and schools), which are located within 100 metres of the site, or are proposed to be located near the facilities. Indicate the proximity of the industrial, factory or project site and or proposed site to residential areas, national parks or areas of ecological, historical or cultured importance.

Indicate whether adequate infrastructure exists at the location and/or proposed location and whether old or new building, roads, electricity, and water lines, or drainage systems exist.

Section 5: Description of Rehabilitation Process

Briefly describe the type and nature of electricity distribution rehabilitation processes at the installation and or proposed installation site.

State the type and quantity of poles to be replaced

<table>
<thead>
<tr>
<th>Type(s)</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

List the type and quantity of raw material(s) used per year in the rehabilitation process (including soil, sand, cement, aggregates, wood, animals etc). Identify the source(s) of raw material(s).
### SECTION 6: PRODUCTS

Briefly state the nature of the products (s) or output of the facility and or proposed facility and or proposed facility, and the expected quantities on a quarterly or annual basis. Indicate the use and or intended use of the product (s).

<table>
<thead>
<tr>
<th>Type</th>
<th>Quantity</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Description of Uses</th>
<th>Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

### SECTION 7: BY PRODUCTS, WASTE MANAGEMENT AND DISPOSAL

Specify the nature of each waste or by-product and the quantity generated or to be generated.

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Quantity in 1 g per week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

State the method of disposal or management of waste (e.g. dump site, burning, bury etc).
<table>
<thead>
<tr>
<th>Type</th>
<th>Method of disposal/management</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Indicate sources of noise pollution, the type/quality of noise (i.e. machinery/repetitive pounding etc).

<table>
<thead>
<tr>
<th>Source of Noise</th>
<th>Type of Noise</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**SECTION 8: ENVIRONMENTAL IMPACTS**

Please indicate environmental impacts(s) that may occur as a result of the rehabilitation process of project.

<table>
<thead>
<tr>
<th>Nature of impact</th>
<th>Y/N</th>
<th>Brief description of the anticipated impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drainage</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Landscape</td>
<td></td>
<td></td>
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<tr>
<td>----------------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Forest Cover</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human POP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Animal POP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soil Erosion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water quantity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Habitats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Quality</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated Global Warming potential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td></td>
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</tbody>
</table>

**Section 9: PROPOSED MITIGATION MEASURES**
Indicate the measure(s) employed to mitigate against likely damage to be caused by the proposed project to humans and/or the environment.

Briefly describe these measures.

<table>
<thead>
<tr>
<th>No.</th>
<th>LIKELY DAMAGE TO</th>
<th>MITIGATION MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Air Quality</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Drainage</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Landscape</td>
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<tr>
<td>4.</td>
<td>Forest Cover</td>
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<tr>
<td>5.</td>
<td>Vegetation</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Human Population</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Animal Population</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Soil Quality</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Soil Erosion</td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Water Quality</td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>Tranquility/Noise</td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>Water Quantity</td>
<td></td>
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<tr>
<td>13.</td>
<td>Special Habitats</td>
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<tr>
<td>14.</td>
<td>Global warming potential</td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>Others</td>
<td></td>
</tr>
</tbody>
</table>

State any and all experience the company has with implementing the above mentioned mitigation measure(s). If they do not have prior experience, what skill(s) do they possess to implement these mitigation measure(s)?

What staff training is provided or will be provided to ensure compliance with health and environmental safety standards?
Annex 13: Line route from Kingtom to Falcon Bridge