UPDATED ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT (ESIA) FOR DESIGN, SUPPLY, AND INSTALLATION OF HIGH VOLTAGE LINE 56.5 km BWISHYURA-KIGOMA IN WESTERN AND SOUTHERN PROVINCES OF THE REPUBLIC OF RWANDA

Final Report

October, 2026

Official Use Only

Table of Contents

Table of Contents **2**
List of Figures **9**
List of Tables **10**
Acronyms and abbreviations **11**
0. Executive Summary **1**
0.1. Overview of the Project 1
0.2. Major and moderate environmental and social impacts 3
0.2.1. Positive Impacts 3
0.2.2. Negative Impacts 4
0.2.3. Risk Classification 5
0.3. Stakeholder consultation 5
Chapter I: Introduction **6**
1.1. Author Presentation 7
1.2. Context and objectives of the Environmental and Social Impact Assessment 10
1.2.1. The immediate objectives of ESIA are to: 11
1.2.2. Long-term objectives of ESIA are to: 11
1.2.3. The following are specific objectives of the study: 11
1.3. Benefits of access to electric power 12
1.3.1. On poverty and hunger 12
1.3.2. On health 12
1.3.3. On education 12
1.3.4. On the improvement of living conditions, particularly for women 12
1.3.5. On decrease of rural exodus 13
1.3.6. On environment 13
Chapter II: Policy, Legal and Institutional Framework **14**
2.1. Strategies and Policies 14
2.1.1. The National Strategy for Transformation (NST2) 14
2.1.2. The National Environment and Climate Change Policy (MoE, 2019) 14
2.1.3. The Green Growth and Climate Resilience Strategy / National Strategy for ClimateChange and Low Carbon Development (2011) 15
2.1.4. The National Biodiversity Policy (2011) 17
2.1.5. The National Forest Policy (2015) 18
2.1.6. The National Wetlands Management Policy (2015) 19
2.1.7. The Rwanda Energy policy (2015) 20
2.1.8. The Energy Sector Strategic Plan (2018/19 – 2023/24) 20
2.1.9. The Rwanda Rural Electrification Strategy (2016) 21
2.2. Legislation 21

Official Use Only

2.2.1. Constitution of the Republic of Rwanda 21
2.2.2. Law on Environment (N°48/2018 of 13/08/2018) 22
2.2.3. Law governing land in Rwanda (N° 27/2021 of 10/06/2021) 23
2.2.4. Law determining the management and utilization of forests in Rwanda(Nº47bis/2013 of 28/06/2013) 24
2.2.5. Law governing biodiversity in Rwanda (N° 70/2013 of 02/09/2013) 24
2.2.6. Ministerial Order establishing the list of Protected Animals and PlantsSpecies in Rwanda (No. 007/2008 of 15/08/2008) 25
2.2.7. Ministerial Order establishing the list of Projects that must undergo Environmental Impact Assessment, Instructions, Requirements and Proceduresto conduct Environmental Impact Assessment in Rwanda (No 001/ 2019 of 15/04/2019) 25
2.2.8. Prime Ministerial Order determining the responsibilities, organization and functioning of Committees in charge of the environment conservation and protection (Nº 126/03 of 25/10/2010) 26
2.2.9. Instruction issued by the Rwanda Environmental Management Authority (REMA) and governing Inspection Process in Environmental Matters (No 001 of 10/01/2020) 26
2.2.10. Law governing electricity in Rwanda as modified to date (No 52/2018 of13/08/2018 – modifying law No 21/2011 of 23/06/2011) 27
2.2.11. National Social Protection Strategy (MINALOC, 2011) 28
2.2.12. Law regulating labour in Rwanda (N° 66/2018 of 30/08/2018) as amended on 08/05/2023 28
2.3. Institutional framework 29
2.3.1. Environment Institutional Actors 29
2.3.2. Rwanda Environmental Management Authority (REMA) 30
2.3.3. Rwanda Development Board (RDB) 31
2.3.4. Rwanda Association of Professional Environmental Practitioners (RAPEP) 33
2.3.5. Institutional actors in the electricity sector 34
2.3.6. Ministry of Infrastructure (MININFRA) 34
2.3.7. Rwanda Energy Group Ltd (REG) 35
2.3.8. Rwanda Utilities Regulatory Agency (RURA) 36
2.4. International conventions and treaties 37
2.5. International Environmental and Social frameworks, procedures and Guidelines 40
2.5.1. World Bank's Environmental and Social Standards (ESSs) applicable to the project 40
2.5.2. World Bank Group Environmental, Health and Safety Guidelines 44
2.5.3. Rwanda EIA Guidelines and WB-ESF 62
Chapter III: Description of the Project and Justification 67
3.1. Project justification 67
3.2. Brief Description of the Project Sites and Major Environmental Challenges 68
3.3. Area of Influence 69
3.4. General Location criteria 69

Official Use Only

3.5. Power line 70
3.6. Line characteristics 71
3.7. Operation and maintenance 72
3.7.1. Right-of-way 72
3.8. Preliminary schedule and project costs 73
Chapter IV: Description of the Current Project Environment (Baseline State) **74**
4 . 1 . Environmental Baseline for Bwishyura-Kigoma Power Line 74
(I) Ruhango District 74
4.1.1. Biophysical Baseline 74
(II) Karongi District 79
4.1.2. Biophysical Baseline Bwishyura-Kigoma Power Line 79
4.1.2.1. Climate and Air Quality 79
4.1.2.2. Topography and Hydrology 79
4.1.2.3. Geology and soils 79
4.1.2.4. Flora (Vegetation) 79
4.1.2.5. Fauna (Wildlife) 80
4.2. Socio-Economic baseline of the project area 81
4.2.1. General conditions of the PAPs 81
4.2.2. Magnitude of the Expected Loss 82
4.2.3. Socio-economic baseline data for Ruhango District 83
4.2.4. Socio-economic baseline for Karongi 85
Chapter V: Presentation and Comparison of Considered Alternatives **88**
5.1. Identification of Alternatives 88
5.2. Analysis of Alternatives 89
Chapter VI: Potential Environmental and Social Impacts **91**
6.1. Introduction 91
6.2. Impact Types 91
6.3. Identification of Potential Impacts 92
6.4. Methodological approach 92
6.4.1. Desk Review 92
6.4.2. Data Collection methodology 92
6.4.3. Impact and risk Assessment Methodology 93
6.4.4. Determination of Significance 95
6.5. Source of impacts 95
6.5.1. Manpower 95
6.5.2. Works 96
6.6. Nature of impacts 96
6.6.1. Permanent impacts 96
6.6.2. Temporary impacts 97

Official Use Only

6.6.3. Power line 97
6.6.4. Access roads 97
6.7. Impact Description 98
6.7.1. Potential Impacts during construction phase 98
6.7.2. Potential Impacts during operational phase 104
6.7.3. Negative Impacts 106
6.8. Summary of Potential Impacts 107
Chapter VII: Mitigation & Enhancement Measures 111
7.1. Impact mitigation measures 111
7.1.1. Mitigation measures during the pre-construction phase 111
7.1.2. Mitigation measures during the construction phase 112
7.2. Mitigation measures during the operation phase 115
7.3. Mitigation Measures for Social Impacts 116
7.3.1. Pre-construction phase 116
7.3.2. Construction Phase 116
7.4. Environmental and Social Management Plan (ESMP) 118
7.4.1. Roles and Responsibilities:REG's Role 118
7.4.2. REG's Environmental and Social Specialists 118
7.4.3. Contractor's Role 120
7.4.4. Role of REG Environmental Officer and External E&S Supervising Consultant 120
7.4.5. RDB and REMA's Role 121
7.4.6. District 121
7.4.7. Local Communities 122
7.4.8. Other Key Stakeholders 122
7.4.9. Physical Cultural Resource (PCR) and Chance Finds Procedure 122
7.4.10. Implementing the ESMP 123
7.4.11. Impacts Characterization 141
7.4.12. Impacts Magnitude Designation 141
7.4.13. Resources and Receptors Sensitivity/Vulnerability/Importance Definition 142
7.4.14. Project Impact Rating 142
7.4.15. Evaluation of Impacts Significance 143
7.5. Description of environmental effects of mitigation measures 145
7.6. Grievance Redress Mechanism 149
7.6.1. Introduction 149
7.6.2. Common likely types of grievances and disputes 149
7.6.3. Grievance Redress Mechanism 150
7.6.4. Description of tasks and day-to-day responsibilities 152

Official Use Only

Chapter VIII: Stakeholder Engagement 154
8.1. Introduction 154
8.2. Consultation Approach 154
8.3. Identification of Stakeholders 154
8.3.1. National Level Stakeholders 154
8.3.2. Local Level Stakeholders 154
8.3.3. Community Level Stakeholders 155
8.4. Summary of Stakeholder Issues and Concerns 155
8.5. Key Outcomes of the Consultation Process 156
8.6. Continuous Stakeholder Engagement 156
8.7. Stakeholder Engagement Strategy During Project Implementation 156
8.7.1. Objectives of Engagement During Implementation 156
8.7.2. Stakeholder Engagement by Project Phase 156
8.7.3. Engagement Methods 158
8.7.4. Institutional Responsibilities 158
8.7.5. Grievance Redress Mechanism (GRM) 158
8.7.6. Monitoring and Evaluation of Stakeholder Engagement 159
Chapter IX: Monitoring Program 160
9.1. Environmental and Social Risk Management Specialists 160
9.2. Environmental monitoring 165
9.3. Institutional/Organizational and Responsibilities in ESMP implementation 165
9.3.1. Role of the Project Implementation Unit (PIU) 165
9.3.2. The Role of REG-EDCL 165
9.3.3. Role of REMA 165
9.3.4. District Local Authorities 166
9.3.5. The local leaders 166
9.3.6. The Role of the Contractors 166
9.3.7. Role of Supervising Consultants 166
9.4. Institutional capacity strengthening 166
9.5. Environmental Awareness and Training Plan 168
9.6. General Emergency Preparedness and Response Measures 169
9.6.1. Coordination with Local Emergency Services 170
9.6.2. Emergency Response Structure at Site Level 170
9.6.3. Training and Simulation Exercises 170
9.6.4. Medical Emergency Preparedness 171
9.6.5. Fire Preparedness 171
9.6.6. Incident Reporting and Continuous Improvement 171
9.7. Costs related to ESMP Implementation 171

Official Use Only

Chapter X: Conclusion and Recommendations **172**
10.1. Conclusion 172
10.2. Recommendations 173
REFERENCES **174**
List of Appendices **177**
Appendix 1: Stakeholder Engagement **177**
Appendix 2: Occupational Health and Safety Procedures **183**
2.1. Identification and Evaluation of Risks 183
2.1.1. Risk identification. 183
2.1.2. Method of evaluation 183
2.1.3. Hazard identification 183
2.2. Risk assessment and Management. 184
2.2.1. Safety Inspections 184
2.2.2. Job hazard analysis 184
2.2.3. Stop work authority. 184
2.3. Personal Protective Equipment 184
2.3.1. Appropriate personnel protective equipment 184
2.3.2. Type of Personal Protective Equipment (PPE) 185
2.3.3. PPE for working at Heights. 185
2.3.4. PPE maintenance and storage 186
2.4. Signs and markings 186
2.5. Incident and accidents management 187
2.5.1. Incident Notification and Reporting 187
2.5.2. Injury and accident management 187
2.5.3. First Aid and Emergency Medical 187
2.5.4. Incident report and notification 188
2.5.5. Contact information: 188
2.5.6. Communication 188
2.6. Material and works handling. 188
2.6.1. Electrical facilities and installation 188
2.6.2. Load handling. 189
2.6.3. Lifting equipment 190
2.6.4. Walking and working surfaces. 190
2.6.5. Ladders handling 190
2.7. Work at heights 191
2.7.1. General requirements 191
2.7.2. Safety while working at heights and permanent attachment. 191
2.8. Fire prevention and protection. 192

Official Use Only

2.9. Site roads and transport of material 192
2.9.1. Work on roads. 192
2.9.2. Driving, traffic, and transport Safety 192
2.9.3. Heavy motor vehicles 193
2.9.4. Light vehicle operations 193
2.10. Housekeeping, Tools, and equipment handling 193
2.10.1. Housekeeping 193
2.10.2. Slips, trips, and falls 193
2.10.3. Tools and equipment 194
2.10.4. Hazard material awareness 194
2.11. Alcohol and Drug Control Plan 194
Appendix 3: Vegetation types crossed by the TL (Estimated RoW) **194**
Appendix 4: Observed fauna types in the project area **195**
Appendix 5: Chance find procedures **195**
Appendix 6: Environment Health and Safety Guidelines for Electric Power Transmission and Distribution **197**
Appendix 7: Indicative contents of waste management plan **200**
Appendix 8: Hazardous Substance Management Plan **201**
Appendix 9: Public Consultation and Stakeholder Engagement Strategy **203**
Appendix 10: Prevention of GBV, Sexual Harassment, Exploitation, and Abuse Plan **204**
Appendix 11: Standardized Incident reporting format **206**
Appendix 12: Contractor's Code of Conduct **207**
Appendix 13: Individual code of conduct **209**
Appendix 14: Air Quality Parameter **210**
Appendix 15: Discharged Water Quality **212**
Appendix 16: Noise parameters, Tolerable limits for Noise **213**

Official Use Only

List of Figures

Figure 1 **Map of Rwanda districts showing location of the project**..... 69
Figure 2: Schematic diagram of 220kV double circuit tower 72
Figure 3: Nyabarongo river. Caption in Murambi Sector of Karongi district..... 75
Figure 4: Land Vegetation Cover in Ruhango District. Source: ATLAS OF RWANDA Agriculture Land Boundaries 76
Figure 5: Flora in the project area dominated with tea in the high mountain of Karongi, banana and maize in the remaining of the area. 77
Figure 6: Nyarusave wetland in Murambi sector adjacent to Nyabarongo river..... 78
Figure 7: Vegetation/Land cover in Karongi district. Source: ATLAS OF RWANDA Agriculture Land Boundaries 80
Figure 8: Rural Settlements in Ruhango district 83
Figure 9: soils in the project area..... 99
Figure 10: Spotted streams in the corridor..... 101
Figure 11: Bird species observed in project sites 103
The potential interactions between the Project and the resources and receptors**Error! Reference source not found.**Figure 12: Interactions of potential sources of impact and potential receptors 140
Figure 13: Grievance redress process for the implementation of this Project..... 151
Figure 14: Description of air color and air quality 211
Figure 15: Air Quality Index Rwanda. 211
Figure 16: Physico-chemical requirements for potable wate. 212
Figure 17: Discharged standards for industrial effluents into water bodies maximum permissible limits (EAS, 2012)..... 212
Figure 18: Ambient air quality standards in respect of noise. 213
Figure 19: Maximum acceptable noise levels inside buildings. 213
Figure 20: Maximum recommended noise dose — Exposure levels. 213

Official Use Only

List of Tables

Table 1 Names and experience of Report authors 7
Table 2: International Conventions to which Rwanda is party 37
Table 3: World Bank's Environmental and Social Standards applied to the project 40
Table 4: Environmental Health and Safety Guidelines 46
Table 5: Summary of EHS Guidelines for Electric Power Transmission and Distribution 53
Table 6: Gap Analysis Between World Bank ESF and Rwanda National Laws 63
Table 7: Line characteristics 71
Table 8: Crops fields crossed by Bwishyura-Kigoma Transmission line/ Ruhango district 75
Table 9: Encountered wildlife along the Bwishyura-Kigoma Power Line 77
Table 10: Vegetation crossed by the line in the district 79
Table 11: Wildlife along the Bwishyura-Kigoma Power Line 80
Table 12: Description of Identified Alternatives 88
Table 13: Analysis of Alternatives 89
Table 14: Assessing criteria and ratings used for determining impact significance 94
Table 15: Significance rating table 95
Table 16 Summary of impacts on the natural environment 98
Table 17: Quantification of negative impacts caused by the proposed TLs 106
Table 18: The summary of the project's impacts on the natural environments. 108
Table 19: Environmental and Social Management Plan (ESMP) for construction of 220kV Lines 124
Table 20: project impact rating table 142
Table 21: Impact Significance Designation Matrix Example 144
Table 22: Impact significance rating example 144
Table 23: Summary of concerns and issues raised by the stakeholders during public consultation 155
Table 24: Parameters of environmental protection at the construction site to be monitored 162
Table 25: detailed capacity building plan 167
Table 26: Environmental Awareness Principles and Topics 169
Table 27: GBV/SEA Reporting template 205
Table 28**: GBV/SEA Training Plan** 205

Official Use Only

Acronyms and abbreviations

7YGP	: 7 Year Government Program
AFSEC	: African Electrotechnical Standardization Commission
CAPP	: Central Africa Power Pool
CÉÉAC / ECCAS	:Communauté Économique des États de l'Afrique Centrale / Economic Community of Central Africa States
CÉPGL	:Communauté Économique des Pays des Grands Lacs/ Great Lakes CountriesEconomic
CES	: Consultant's Environmental Specialist
CESMP	: Contractor Environmental and Social Management Plan
CO_2	: Carbon Dioxyde
CSOs	: Civil Society Organizations
DEM	: Digital Elevation Model
DRC	: Democratic Republic of Congo
EA	: Environmental Audit
DTM	: Digital Terrain Model
EAPP	: East African Power Pool
EARP	: Electricity Access Roll out Program
EDCL	: Energy Development Corporation Limited
EDPRS	: Economic Development and Poverty Reduction Strategy
EIA	: Environmental Impact Assessment
EMP	: Environmental Management Plan
eSWAP	: Energy Sector Wide Approach
ESWG	: Energy Sector Working Group
ESSP	: Energy Sector Strategic Plan
EUCL	: Energy Utilities Company Limited
FONERWA	: Rwanda National Green Fund
GGCRS	: Green Growth and Climate Resilient Strategy
GGGI	: Global Green Growth Institute
GoR	: Government of Rwanda
KWh	: Kilo Watt/hour
LNP	: Liquid Natural Gas
LPG	: Liquefied Petroleum Gas
MININFRA	: Ministry of Infrastructure
MoE	: Ministry of Environment
MV	: Medium Voltage
MW	: Mega Watts
NDCs	: Nationally Determined Contributions
NGOs	: Non-Governmental Organizations

Official Use Only

NST1	: National Transformation Strategy – Phase 1
PPA	: Power Purchase Agreement
RAPEP	: Rwanda Association for Environmental Practitioners
RDB	: Rwanda Development Board
RECO	: Rwanda Energy Corporation
REG	: Rwanda Energy Group
REMA	: Rwanda Environment Management Authority
REP	: Rwanda Energy Policy
NLA	: National Land Authority
ROW	: Right-of-Way
RURA	: Rwanda Utility Regulatory Agency
RFA	: Rwanda Forestry Authority
SADC	: Southern Africa Development Community
SAPP	: Southern Africa Power Pool
SDGs	: Sustainable Development Goals
SE4ALL	: Sustainable Energy for All
SEA	: Strategic Environmental Assessment
SEO	: Contractor's Site Environmental Officer
SRTM	: Shuttle Radar Topography Mission
USAID	: United States Agency for International Development
USD	: United States Dollars
VAT	: Value Added Tax
WAPP	: West Africa Power Pool
YESD	: Young Engineers Skills Development Program

Official Use Only

0. Executive Summary

0.1. Overview of the Project

One of the strategic objectives of the National Strategy for Transformation (NST1) and its successors-EDPRS I & II- is to expand electricity access while at the same time improving quality of supply at the lowest possible cost.

To achieve the said objectives, the Government of Rwanda through Rwanda Energy Group under subsidiary of Energy Development Corporation Limited (REG/EDCL) is planning to implement the "Accelerating Sustainable and Clean Energy Access Transformation (ASCENT)".

The overarching objective of this project is to increase access to reliable energy for households, enterprises and public institutions; and enhance the efficiency of electricity services in Rwanda. The specific objective of the sub-project is to improve grid stability and reliability to enable Rwanda to accelerate the access program with reliability and efficiency under component two of the project.

In this regard, REG/EDCL is conducting the Environmental and Social Impact Assessment (ESIA) to comply with the national and WB ESF to protect the environment, and has commissioned this ESIA for the 56.5 km, 220 kV double-circuit Bwishyura–Kigoma transmission line. This project will be implemented in sectors of Kinihira, Kabagali, Bweramana and Ruhango of Ruhango district of Southern province and in sectors of Bwishyura, Gitesi, Rugabano, Murambi and Kilinda in Karongi district of Western province of Rwanda.

This report presents the Environmental and Social Impact Assessment (ESIA) for the 56.5 km, 220 kV double-circuit Bwishyura–Kigoma transmission line, prepared for the Government of Rwanda under the ASCENT Project funded by the World Bank.

The planned 220kV transmission line will specifically help to improve the quality of electricity supply in Rwanda and strengthen the backbone of the transmission network, thus providing additional capacity to cope with the growth of demand, under conditions of safety and quality in line with the requirements of the public electricity service.

The power system analysis of the transmission line and substation using PSS/E and/or DIgSILENT power system analysis models justified the project benefits in terms of technical lossreduction, transit capacity enhancement, safety (N-1), robustness, stability, etc. The simulations will mainly quantify these advantages and disadvantages. The project will generate quantifiable and non-quantifiable technical and economic benefits. As part of the economic analysis of the project, we will consider, among other things, the following benefits:

- Reduction of technical losses; because of better load distribution.
- The increase in energy supply caused by access to the network of previously unmet customers because of the capacity limit or the quality of delivery.
- Reduction of CO_2 emissions, through access to the network of new customers.
- etc.

The increased rate of access to electricity will undoubtedly contribute to achieving the Objectives of the National Strategic Development Plans and Goals.

In this regard, the purpose of this ESIA is to provide the necessary information on the proposed project to guide decisions for the relevant institutions. The ESMP provides guidelines for the proposed project for it to be implemented by complying with National environmental Law and WB ESF. This ESIA Report also proposes mitigation measures to potential impacts that have been

Official Use Only

identified, which are required during implementation of the proposed project.

The specific objectives of the ESIA are to provide, inter alia:

a) A description and analysis of the prevailing environmental and social baseline of the Project Area, paying special attention to the existing land uses, as well as fragile ecosystems and environmentally important areas, which include wetlands, forests and protected areas, in cognizance of applicable environmental and social risk management by complying with the World Bank Environmental and Social Framework (ESF).
b) A review of policy, legal and institutional framework for the project, providing a summary of important policies, legislation, regulations and guidelines that are likely to be applicable to the project.
c) Consideration and documentation of inputs, concerns and suggestions of key stakeholders regarding the identification, analysis, assessment and mitigation of the potential environmental and social impacts of the proposed project through public consultations with relevant Government Ministries, NGOs / CBOs, community leaders and Project Affected Parties (PAPs);
d) Assessment of the direct and indirect environmental and social impacts of the planned project activities and paying special attention to direct and indirect gender impacts(access, utilization and reducing the gender poverty gap) of the proposed project activities.
e) Environmental and Social Management Plan (ESMP) detailing mitigation measures for addressing the identified potential negative environmental and social impacts of the project and their timing vis a vis the construction and operational phases of the project; and
f) Monitoring plan with clear monitoring indicators, budget estimates and institutional roles for tracking the implementation of and compliance with the proposed mitigation environmental and social measures.

The project activities will consist mainly in the following:

- Construction of roads to access work sites.
- Clearing of the line's right-of-way.
- Site installation including construction of temporary material storage and personnel office area for construction activities of power lines.
- Excavation works and other earthmoving and tower construction activities.
- Transportation of materials
- Stringing.
- Energizing.
- Commissioning.
- Maintenance (clearing) of the right-of-way during operation phase as a way for permanent control of vegetation;

The identification of project alternatives includes the consideration of the proponent's 'preferred option', as detailed in the preliminary route design drawings. Other project alternatives are also identified through considering the following aspects:

a) Route alignment and/or location of project activities.
b) Designs of electrical infrastructure and what technology is proposed.
c) Use of alternative technology; and
d) Various implementation methods and techniques.

The above aspects are considered, and the alternatives identified for the project are:

Official Use Only

Preferred Option: Overhead Power Lines

This alternative is as proposed in the feasibility study and detailed in the preliminary route designs received for the project, involving overhead power lines. The proposed line routing and ROWs are selected among the various options, based on the need to satisfy the set criteria. The environmental soundness was considered equally with any other technical or financial considerations when selecting the line routings and right of way (RoW).

In selecting the proposed route, the over-riding considerations were:

- The avoidance of environmentally sensitive areas and settlements,
- The minimization of the destruction of property and farms,
- Easy access to construction and operation sites,
- Low pollution level and
- Favourable geotechnical conditions for the stability of foundations were also considered.

0.2. Major and moderate environmental and social impacts

Environmental impacts of the installation of transmission lines were assessed by using data collected during field investigations, from data collection in offices of ministries and other institutions, review of relevant documents, databases, maps and satellite imagery, as well as consultation with different partners interested in the project, and meetings with the population living in the project area. The following are the major and moderate impacts on the selected environmental components:

0.2.1. Positive Impacts

With regard to social impacts, the study elucidated that positive social impacts will result from the new (or improved) electricity supply, which allows economic development and improvements in living conditions.

The overall positive social impact of the construction of 220kV Lines in Rwanda can be anticipated by the economic development of the handicraft and especially the agri-business sector. The benefits of the project for domestic supply and use in small-scale businesses and in access to electric power for schools and public services are evident. Supplyof pumped water will be facilitated and there will be safer and more efficient operation of key services, through electricity access to villages along the transmission and distribution lines served.

The possibilities of an Electricity Supply Project linked to Poverty Reduction can be seen in an increased income, an enhanced productivity and quality of life, a contribution to Human Development, influenced migration, and by a contribution to security.

During the preparatory and construction phases of power lines, the positive impacts are:

(1) The creation of financial income as a result of the temporary jobs that will be created for local workers from the sectors/districts concerned by construction works and compensatory reforestation activities. It is estimated that up to 150 persons will be directly employed by the project for construction works and receiving regular salaries; and

(2) The creation of financial income for local traders including women selling food items along the construction sites.

(3) Job Creation due to the availability of sufficient energy and electricity network strengthening.

Official Use Only

0.2.2. Negative Impacts

During the preparatory and construction phase of power lines, negative impacts areforeseeable, but can be mitigated using appropriate measures. These especially are:

(1) Loss of land for tower location, loss of houses that are located within 30m of Right of Way under Transmission lines, Loss of trees and crops within the same right of Way extended on the 169.5 ha, all those losses will be compensated based on the National Expropriation Law in Public Interest of 2015 and World Bank ESF. The permanent land acquisition will happen for the land of the tower location and houses within the Right of way, whereas for the remaining portion of the land only trees and crops will be paid, because the PAPs will be allowed to use the same land after the construction phase of the project.

(2) Based on the field survey, it was established that 982 households in total will be affected and among them 160 households will permanently lose a portion of their land equivalent to an estimated 1.975 ha, whereas the remaining households will lose only crops and trees planted on their land.

(3) Construction work for the lines and pylons will have impacts on the soils, the excavation of which could increase the process of erosion, plus the potential risk of contamination from spillages of oil or other contaminants.

(4) The construction phase will affect the air quality and generate noise levels higher than those currently present in most of the sectors. This temporary impact will disappear with the end of the construction phase.

(5) The risk of HIV/AIDS and other diseases propagation as a result of the arrival of workers from outside the area in the villages and possible occurrence of unprotected sexual relations with women of the localities concerned. To address this risk, appropriate IEC actions on HIV/AIDS are recommendedin the various localities.

(6) The risk of accidents during clearing and excavation works and other installations of equipment and stringing of power lines. Adequate signaling of construction sites and the provision of workers with appropriate safety equipment such as helmets, gloves, safetybelts and safety shoes are proposed to minimize this risk.

(7) Loss of natural herbaceous, shrubby and savannah vegetation - and consequently of small wildlife habitat – because of works to clear the rights of way. During construction, the requirements to free the right of way and maintenance work on the lines will lead to the removal of tree cover. The growing of certain trees such as banana trees, which do not exceed a height of 4 to 5 meters, will, however, be allowed. Contractors will also ensure that their workers comply with forestry and wildlife regulations.

(8) Risks of pollution of surface water as a result of poor storage of hydrocarbons and wasteoils from construction site machines. To mitigate this risk, contractors shall ensure that construction site machines are maintained, and their oil changed in impervious areas designed for this purpose. Waste oils will be collected and stored in waterproof tanks to be provided for, from the start of works.

(9) During the equipment operation phase, there is the risk of accidents by electrocution. This risk will be mitigated through an adequate Health and Safety Plan and measures for newly constructed electrical installations as well as electrical appliances that will function using this energy.

(10) Accident risks also concern specialized workers in charge of equipment maintenance. They must

Official Use Only

be provided with appropriate safety equipment in use for their profession: helmets, gloves, safety shoes, safety belts…

(11) Health risks for the population because of the electromagnetic field of power lines and transformers.

(12) The construction of a transmission line can lead to several social impacts, notably Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and challenges related to labor influx. The Project will limit this risk by recruiting workers from the host community. The arrival of a predominantly male workforce into rural or peri-urban communities can disrupt social dynamics, especially in areas with limited infrastructure. This may increase the risk of GBV and SEA, particularly for women and girls, due to power imbalances and economic vulnerability. Additionally, a sudden influx of workers could strain local services such as water, housing, and healthcare, potentially leading to tension between communities and workers.

Project position on worker camps and labor influx: no worker camps will be built for this Project. Unskilled and semi-skilled labor will be recruited locally in Karongi and Ruhango districts. A small number of specialist workers (for example stringing crews, tower erection supervisors and commissioning engineers) may come from outside the area. They will stay in rented lodging in existing towns and trading centers near the works and not in purpose-built camps. Every provision in this ESIA that refers to camp rules, curfews or the influx of workers is a contingency measure that applies to this group of specialist workers only, and is labelled as such. If a worker camp later proves unavoidable, none will be set up until the ESMP and the labor influx management plan have been updated and approved by REG/EDCL and the World Bank.

The main legal and regulatory instruments governing the environmental management in Rwanda are quoted and an analysis of the legal and administrative framework related to resettlement and compensation measures is elaborated in the context of the Resettlement Action Plan.

The Government of Rwanda through REG-EDCL will be responsible for the payment of the compensations. It is the requirement of the national law on expropriation in public interest of 2015, ESF-ESS5 that no civil works for project implementation can begin if the compensations have not been provided for the affected community.

0.2.3. Risk Classification

As categorized in the Project ESMF and based on the impact assessment done, the environmental and Social risk rating of this project is substantial considering the anticipated risks and impacts associated with construction of this 220KV transmission line.

0.3. Stakeholder consultation

Consultations were conducted at National, District and Local levels. At local level, Consultations were held along the entire lengths of the power lines corridors during the period of 14th to 28th August 2023. However, due to COVID-19 induced lockdown this activity was not done in the classical way because, in order to respect social distancing at some site we used telephone, and other communication means such as skype call and zoom.

Official Use Only

Chapter I: Introduction

The Government of Rwanda (GoR), through the Ministry of Infrastructure (MININFRA), has secured funding from different development partners including the World Bank, Asian Infrastructure Investment Bank among others based on the successful implementation of the multi-donor Electricity Rollout Access Program (EARP), which saw the access rate increase from 12% in 2012 to 61% in 2023. The government of Rwanda, in its desire to achieve universal electricity access by 2024, has requested donors to finance the Rwanda Universal Electricity Access Program (RUEAP)" under Rwanda Energy Group (REG). Under RUEAP, these co-financers will finance the Transmission Line from Bwishyura to Kigoma (56.5 km) sub-project which will be implemented in Karongi and Ruhango districts.

For the purpose of implementing the RUEAP, the GoR has established the RUEAP Program Implementing Unit (PIU) in EDCL to facilitate project implementation regardless of the source of funding, i.e., it is a multi-donor program. Under RUEAP, REG through its subsidiary EDCL with World Bank (WB) is undertaking an Enhancing the efficiency of electricity service which will support investments towards improving grid stability and reliability to enable Rwanda to accelerate the access program with reliability and efficiency which will comprise the construction of the Proposed 220kV Double Circuit Bwishyura-Kigoma transmission Line for the World Bank funding and the Government of Rwanda (GoR).

The Law on Environment on environmental protection made Environmental Impact Assessment (EIA) mandatory for approval of major projects, activities and programs in the Republic of Rwanda. This report contains the Environmental Impact Assessment for the 220kV Double Circuit Bwishyura-Kigoma Transmission Line under the ASCENT Project. The line covered by this ESIA is funded by the World Bank.

The overarching objective of the project is to reinforce the Rwanda transmission network and improve the rate of access to electricity supply for the people of Rwanda. The specific objective of this ESIA is to study the environmental and social impacts of the selected transmission line.

The identification of the impacts of this project on the environment showed that during the project phases (pre-construction, construction, operation and decommissioning) there will be a big number of positive impacts on the human environment. This project will contribute to the creation of employment, expand electricity access while at the same time improving quality of supply at the lowest possible cost, compatibility with the scale of economic development in Rwanda, potential creation of synergies with other sectors, knowledge transfer, economic diversification and improved local socio-economy, gender balance enhancement, rational exploitation of Rwandan natural resources, possibility of savings for the employees, etc.

In this regard, REG/EDCL is conducting the Environmental and Social Impact Assessment (ESIA) to comply with the national and WB ESF to protect the environment, and has commissioned this ESIA for the 56.5 km, 220 kV double-circuit Bwishyura–Kigoma transmission line. This project will be implemented in sectors of Kinihira, Kabagali, Bweramana and Ruhango of Ruhango district of Southern province and in sectors of Bwishyura, Gitesi, Rugabano, Murambi and Kilinda in Karongi district of Western province of Rwanda.

This report presents the Environmental and Social Impact Assessment (ESIA) for the 56.5 km, 220 kV double-circuit Bwishyura–Kigoma transmission line, prepared for the Government of Rwanda

Official Use Only

under the ASCENT Project funded by the World Bank.

Different mitigation measures for these negative impacts have been proposed to reduce to the minimum their effects on the socio-economic environment as well as on the biophysical environment. These include general environmental management conditions and a number of specific mitigation measures such as:

- Overall environmental management
- Dust management
- Solids and liquid wastes management,
- Land and biodiversity protection,
- Air quality management,
- Wastewater management,
- Management of Hazardous Materials and Oils,
- Health and safety management
- Compensation to the impact of involuntary resettlement
- Etc.

In order to put these mitigation measures into practice, an environmental management plan has been developed to guide all activities of the project concerning the protection of the environment. Recommendations are also given so that the execution of the project becomes a successwithout harming or with the least negative effect to the environment.

1.1. Author Presentation

Table 1 Names and experience of Report authors

SN	Names	Position	Experience	Role
1	KAREKEZI W. Emmanuel	E&S Consultant	Mr. Karekezi W. Emmanuel holds a Masters in Environmental and Development Studies with specialization in Environmental Economics and Natural Resource Management and a Bachelor of Science (BSc.) in Environmental Chemistry. He also has a Diploma in Environment Health and Safety Management. I am also certified Environmental and Social Governance (ESG) Trainer by International Finance Corporation (IFC). He is a Certified Project Management Professional (PMP). He has more than ten years' full-time experience in the field of Environment, Social, Health and Safety with experience of working with private sector and different donors, AfDB, World Bank, Nordic Development Fund (NDF), UNDP amongst others where training staff on Environment, Social, Health and Safety Aspects were considered as principal task. He has a sound experience in supervising the compliance of safeguard component of the projects funded by different donors. He also led	Main Author

Official Use Only

SN	Names	Position	Experience	Role
			different assignments of conducting Environmental and Social Impact Assessment Studies. He is conversant in dealing with different stakeholders in general and the communities as part of Corporate Social Responsibility (CSR) in both private and public institutions.	
2	BORAMUNGU Apophia	EDCL-Senior Environmental and Social Risk Management Specialist	A Licensed Lead ESIA expert with the Rwanda Association of Professional Environment Practitioners (RAPEP) and IFC Certified Environmental and Social Governance trainer of trainers (ToT) with 10 years of professional experience in the area of environmental and social risk management working with international organizations and Multilateral Development Banks such as the World Bank, the African Development Bank, the European Investment Bank, the Agence Francaise de Development, the Asian Infrastructure Investment Bank, the Korean Exim Bank, among others. Her areas of expertise consist mainly in preparing and reviewing environmental and social framework compliance instruments such as Environmental and Social Management Framework and Environmental and Social Impact Assessment (ESMF/ESIA/ESMPs), Resettlement Policy Frameworks and Resettlement Action Plans (RPF-RAPs), Stakeholders Engagement Plan (SEP), Labour Management Procedures (LMPs), and Environmental and Social Commitment Plans (ESCPs), Environmental Health and Safety Plans (EHSP) for various infrastructures mainly construction of electrical lines, roads, informal settlement upgrading, drainage systems, and cross-border markets and coordinate their implementation by relevant stakeholders throughout project implementation. Furthermore, she provides an environmental and social risk management outlook to the engineering designs of the above-mentioned infrastructures so as to ensure the avoidance or minimization of environmental and social impacts. She holds a Master's degree in Environmental Economics and Natural Resources Management and Bachelor's degree in environmental science majoring in	Review and team coordinator

Official Use Only

SN	Names	Position	Experience	Role
			Biology and Chemistry.	
3	Willy UWIZEYE	EDCL-SSS	Experienced in Social Sciences with more than 15 years in different project designs, implementation, monitoring, and completion, and familiar with Rwanda environmental and social risks management, World Bank (WB) Environmental and Social Framework (ESF), AfDB Integrated Safeguards System (ISS) and other development partners safeguards framework (KOICA, EIB, AfDB, EXIM Bank, etc.) in different sectors like agriculture, transport, health and energy. Holder of technical skills and knowledge on Environmental and Social risks management instruments preparation such as SEP, LMP, RPF/RAP, ESMF/ESIA as well as mainstreaming of gender and social aspects in projects operations and providing support to projects beneficiaries and other stakeholders/ partners in identifying, gender mainstreaming and monitoring social risk management aspects in project-funded operations at identification, preparation, appraisal, implementation, and completion stages. Holder of master's degree in environmental and development studies, majored in Environmental Economics and Natural resource management, Master of Public Administration and management and Bachelors of Sociology.	Reviewer
4	TUYISHIME Pascal	EDCL-Environmentalist	Registered Environmental Assessment LEAD Expert with Rwanda Association of Professional Environment Practitioners (RAPEP) and IFC Certified Environmental and Social Governance. Skilled in risk management, environmental protection, waste management, hygiene & sanitation, grievance redress, public awareness campaigns, and gender mainstreaming. Extensive experience in implementing environmental and social safeguards policies from donors like World Bank ESF and AfDB Integrated Safeguard System (ISS) in different sectors like Energy, Transportation, Water supply and Sanitation, and Irrigation among others. Proficient in developing and executing E&S instruments such as ESMF, RPF, ESIA, RAP, and ESMP. Committed to promoting sustainable environmental health and	Reviewer

Official Use Only

SN	Names	Position	Experience	Role
			social management programs.	
5	EMERA Joseph Erasme	EDCL-ESS	A certified Environmental and Social Impact Assessment (ESIA) Associate Expert under the Rwanda Association of Environmental Practitioners (RAPEP), holding a Master of Science degree in Environmental Management and seven years of experience in conducting diverse environmental studies. Specializes in developing and implementing environmental and social instruments for donor-funded projects, including but not limited to ESMP, ESIA, RAP, EHSP.	Reviewer
6	Andre MUGENZI	EDCL-SSS	Environmental and Social Risk Management Specialist with 12 years of experience in project design, implementation, monitoring, and completion across local government, health, and energy sectors. Experienced in Rwanda's environmental and social risk management requirements and the safeguard frameworks of the World Bank (ESF), AfDB (ISS), EIB, EXIM Bank, and other development partners. Skilled in preparing environmental and social instruments, including SEP, LMP, RPF/RAP, ESMF, and ESIA, as well as mainstreaming gender and social considerations throughout the project cycle. Experienced in supporting project beneficiaries and stakeholders in identifying, managing, and monitoring environmental and social risks. Holds a Master of Science in Project Management and a Bachelor's degree in Social Sciences, majoring in Development Studies, and is pursuing a Master's degree in Environmental and Development Studies, specializing in Environmental Economics and Natural Resource Management.	

1.2. Context and objectives of the Environmental and Social Impact Assessment

Rwanda takes environmental protection very seriously and has taken significant steps to ensure the balance between economic development and environmental protection, as well as to prevent environmental degradation. Notable among the measures taken is for example the ban on manufacturing and use of polyethylene bags. The Government has established a clear legal and institutional framework for environmental protection. Rwanda Environmental Management Authority (REMA) is the principal agency responsible for the management of the environment in

Official Use Only

Rwanda and coordinates, monitors and supervises all activities in this field.
In addition, as per the law, projects that affect the environment are subject to Environmental & Social Impact Assessment (ESIA) prior to obtaining authorization for their implementation.
Environmental Impact Assessment (ESIA) is defined as a systematic process of identifying environmental, social and economic impacts of a project before a decision of its acceptance is made. The law defines types of projects that have to undergo EIA before they are allowed to go ahead with implementation. General objectives of the environmental impact assessment are:

- To identify potential environmental impacts of the lines, both positive and negative;
- To draft an Environmental and Social Management Plan (ESMP) including impactmitigation measures and an environmental monitoring program; and
- To estimate costs of mitigation measures.

1.2.1. The immediate objectives of ESIA are to:

1. Improve the environmental and Social design of the project
2. Ensure that resources are used appropriately and efficiently
3. Identify appropriate measures for mitigating the potential negative impacts of the project
4. Facilitate informed decision-making, including setting environmental terms and conditions for implementing the project.

1.2.2. Long-term objectives of ESIA are to:

1. Protect human health and safety
2. Avoid irreversible changes and serious damage to the environment
3. Safeguard valued resources, natural areas and ecosystem components
4. Enhance the social aspects of the project

1.2.3. The following are specific objectives of the study:

1. To detect the effects of the project on the neighboring environment such as the water bodies, the soil, neighboring communities, the infrastructure, the fauna, the flora and possible atmospheric impacts.
2. To propose alternative measures where it is noticed that adverse effect may occur;
3. To propose mitigation measures where adverse effects may have occurred;
4. To carry out a diagnosis of the existing environment and activities in the area ofthe project;
5. To highlight the potential of the construction of 220kV lines and substations with regard to environmental issues;
6. To propose enforcement measures where beneficial effects from the project are detected;
7. To set up an environmental management plan that will govern all activities of the projectfor the better protection of the environment.

Through the Environmental Study of this project, the focus was to identify the main environmental and social stakes raised by the power lines & Sub-stations, construct and define the best ways of optimizing the projects from the environmental point of view by avoiding, minimizing or offsetting negative environmental impacts. As a first step, an Environmental and Social diagnosis was established after analysis of the current state of the various environmental aspects in close

Official Use Only

collaboration with concerned stakeholders including local population affected and local institutions and NGOs. Secondly, plans for the implementation and monitoring of measures limiting these negative impacts of projects on the environment were prepared. Thirdly, detailed estimate costs of these measures for- during and after execution of the projects were established.
This ESIA Report was prepared in compliance with the guidelines of the Government of Rwanda, as well as policies and procedures of the WB-ESF (see Chapter II on Legal and Institutional Framework).

1.3. Benefits of access to electric power

Power being today a major drive of development, the increase of the rate of access to electric power will certainly contribute to the achievement of the Strategic Development Plans of the Countries as well as the Sustainable Development Goals (SDGs) as defined by the UN, particularly the SDG 7 aiming at ensuring access to affordable, reliable, sustainable and modernenergy for all.
Indeed, power appears more and more to be a basic good without which true development is not possible. Thus, access to energy, and particularly electricity, is a major lever of development with its effects:

1.3.1. On poverty and hunger

Access to electric power allows for a longer working day thanks to access to light and time and money saved (easier access to energy and water). Moreover, the use of electric equipment for irrigation makes it possible to increase handicraft and agricultural productivity.
The availability of energy is also an economic development factor because it allows the development of small and medium enterprises as well as automation of processing activities for agricultural products and their conservation (refrigeration).

1.3.2. On health

The availability of electricity in health centers allows the storage of medicines (refrigeration) and increased safety at night during delivery. In addition, access to communication means (TV, radio, Internet) facilitates transfer of knowledge on basic topics such as protection against HIV-AIDS and malaria as well as telemedicine. Access to electric light also decreases internal pollution due to cooking with wood and charcoal, candles, and kerosene lamps, which reduces risks of respiratory problems. At last, access to electricity by improving living and working conditions of nurses and doctors will encourage them to remain in villages.

1.3.3. On education

Time saving thanks to energy and access to electric lighting makes it easier for pupils to studyat night in good conditions. Availability of electricity allows for access to the Internet and tele-education, which thus increases access to knowledge. The availability of electricity also prompts teachers to remain in rural areas and not migrate to towns. Furthermore, access to electricityand water helps improve teaching conditions and the organization of night classes for adults.

1.3.4. On the improvement of living conditions, particularly for women

Within the household, women often perform most of domestic tasks. Time saved thanks to access to electricity and the elongation of the duration of a working day thanks to electric light help women organize in a more flexible way their day and above all practice an incomegenerating activity. Thus, they have enough personal income that ensures that they are more and more autonomous and have a better quality of life. In addition, access to media (TV, radio, Internet) helps to make progress in

Official Use Only

the image of women in the traditional societies.

1.3.5. On decrease of rural exodus

The improvement of living conditions of rural households and local job creation thanks to economic development help reduce the need for rural exodus.

1.3.6. On environment

Access to electricity reduces the need for biomass that is often overexploited. The use of hydropower energy also helps avoid production of greenhouse gases such as CO_2 coming from the combustion of wood and charcoal for heating and cooking.

Official Use Only

Chapter II: Policy, Legal and Institutional Framework

Rwanda has a very comprehensive legal and institutional framework in relation to environmental protection, starting from the National Constitution, as well as specific laws on matters pertaining to environment or Natural Resource Protection.

2.1. Strategies and Policies

2.1.1. The National Strategy for Transformation (NST2)

The development landscape in Rwanda has changed considerably since the adoption of the Vision 2020 in the year 2000. The progress made in less than two decades has given Rwandans much hope and belief to aspire for greater achievements. Before the Vision 2020 has come to term, Rwanda embarked in 2017 on the reflection and elaboration of a Vision 2050, which aspires to take Rwanda to high living standards by the middle of the 21st century and high-quality livelihoods. The implementation instrument for the remainder of Vision 2020 and for the first four years of Vision 2050 was the National Strategy for Transformation (NST1). NST1 provided the foundation and vehicle towards Vision 2050.

The National Strategy for Transformation (NST2), which is the five-Year Government Program (5YGP), comes at a unique moment in the country's development trajectory which will see the crossover from Vision 2020 towards Vision 2050 and serves as the continuity of the NST1. This strategy is expected to lay the foundations for decades of sustained growth and transformation that will accelerate the move towards achieving high standards of living for all Rwandans.

The NST 2 will pick up from where NST1 left off, and continue in an effort to accelerate the transformation and economic growth with the private sector at the helm. With this new strategy, Rwanda's public policy will focus on developing and transforming Rwandans into a capable and skilled people ready to compete in a global environment.

2.1.2. The National Environment and Climate Change Policy (MoE, 2019)

Vision 2050 aspires to take Rwanda beyond high income to high living standards by the middle of the 21st century. To realize our full potential and drive towards this goal, Rwanda is committed to being a nation that has a clean and healthy environment that is resilient to climate variability and change and that supports a high quality of life for its citizens. This Environment and Climate Change Policy reaffirms the government's commitment to address climate change and its resolve to lessen the potential hardships that climate change may pose to the sustainable development of the country. The policy, therefore, seeks to provide strategic direction on environment and climate change in Rwanda, bearing in mind its linkages with the country's socio-economic development.

The National Environment and Climate Change Policy provides strategic direction and responses to the emerging issues and critical challenges in environmental management and climate change adaptation and mitigation. The key issues and challenges identified include high population density, water, air and soil pollution, land degradation, fossil-fuel dependency, high-carbon transport systems, irrational exploitation of natural ecosystems, lack of low-carbon materials for housing and green infrastructure development, inadequate waste treatment forboth solid and liquid waste, increase of electronic, hazardous chemicals and materials waste, among others.

The policy is designed within the context of national, regional and global development commitments (e.g. Vision 2050 aspirations, National Strategy for Transformation (NST1), GreenGrowth and Climate Resilience Strategy (GGCRS), Nationally Determined Contributions (NDCs), Sustainable Development Goals (SDGs), Agenda 2063, East African Community - EACVision 2050, etc.). It also provides a policy framework to tap

Official Use Only

into opportunities of a green growthled and climate resilient economy. This Policy was developed through a consultative process involving all stakeholders. Consultations with actors at national and district levels, development partners, the private sector and CSOs informed the development of policy objectives and proposed policy actions.

The policy goal is for "Rwanda to have a clean and healthy environment resilient to climate variability and change that supports a high quality of life for its society." The seven objectives of the policy are (1) Greening economic transformation; (2) Enhancing functional natural ecosystems and managing biosafety; (3) Strengthening meteorological and early warning services; (4) Promoting climate change adaptation, mitigation and response; (5) Improving environmental well-being for Rwandans; (6) Strengthening environment and climate change governance; and (7) Promoting green foreign and domestic direct investment and other capital inflows. To implement these policies, 22 policy statements and 127 policy actions have been identified.

It is evident that energy component, particularly production and promotion of clean energy and making it accessible to the citizens is central to this policy, especially implicitly implied in strategic objective (1) Greening economic transformation; and (4) Promoting climate change adaptation, mitigation and response.

Key relevant action points are:

- Promote resource efficiency technologies to reduce energy consumption inprocessing industries.
- Promote renewable energy to achieve universal access to electricity.
- The ESIA is a key instrument to ensure environmental sustainability and hence anelement toward realization of the policy's goals and objectives.

2.1.3. The Green Growth and Climate Resilience Strategy / National Strategy for ClimateChange and Low Carbon Development (2011)

This strategy is one of the initial steps on a pathway which leads to a sustainable, secure future where Rwanda is prepared for the risks associated with climate change, population growth and rising oil prices. The 'National Strategy for Climate Change and Low Carbon Development' aims to build upon work that is already being done in Rwanda on climate change, focusing thevarious projects and policies into a holistic national document which encompasses long-term direction and short-term actions.

The focus thus far has been on adaptation as Rwanda is highly vulnerable to climate changedue to its dependence on rain-fed agriculture. However, the focus is shifting to climate resilience and low carbon development which addresses both adaptation and mitigation, whilst focusingon sustainable economic growth and poverty reduction. Rwanda has the opportunity to leapfrog old technologies and destructive development pathways, and build a green economy, resilient to oil price spikes and a changing climate.

This Strategy however, looks beyond 2020 to 2050, and recommends actions that Rwanda can take in the short to medium term to ensure its future stability and prosperity in a changing climate and uncertain energy future.

The purpose of the Strategy is threefold:

- To guide national policy and planning in an integrated way;
- To mainstream climate change into all sectors of the economy; and
- To position Rwanda to access international funding to achieve climate resilience and lowcarbon development.

With regard to Energy development, this is key strategic objective for this strategy:

To achieve Energy Security and a Low Carbon Energy Supply that supports the development ofGreen Industry and Services and avoids deforestation

Rwanda will exploit its clean energy resources to support a low carbon national grid which will enable industry to operate in a low carbon way. The grid will be expanded, enabling development and reducing the demand

Official Use Only

for wood fuel and charcoal, thus avoiding deforestation. This move to a low carbon economy will reduce vulnerability to oil price spikes and improve energy security. More specifically, this Strategy has 2 specific Action Programs pertaining to Energy and energy diversification:

1) Program 5: Low Carbon Energy Mix Powering the National Grid

Currently the country's generating capacity is about 224.6 MW, with a maximum demand as high as 150 MW, which will continue to escalate as the economy recovers. The deficit is heavily experienced during peak periods, thus periods of high electrical energy demand. This deficit has sometimes resulted in erratic and sustained load shedding during peak hours.

2) Rwanda Energy Group data, 2023

In order to distribute the power generated by different sources of energy, electrical transmission lines ranging from high voltage to low voltage have to be in place.

The Rwanda electricity transmission network has been constructed since the 1950s and continues to expand. Currently regional interconnections are under development to allow power trade in the region.

The national energy balance statistics in Rwanda is by far led by biomass (83%), followed by petroleum products (9.7%) and electricity (1.3%) while others are less than 0.5%.

The energy matrix of Rwanda sums up to 224.6 MW of installed capacity of which 2% comes from imports. The renewable energies with Hydro (47%) and solar (5%) count for more than half of the installed capacity while Diesel (27%) and Peat, Methane gas respectively count for 7% and 12%.

3) Program 6: Sustainable Small-scale Energy Installations in Rural Areas

The majority of Rwanda's population does not have access to the electricity grid and is dependent on wood for fuel. There is much potential for off-grid or mini-grid generation from biogas, solar PV and micro-hydropower. This should be utilised to increase access to electricity in rural areas reducing the dependence on wood fuel and supporting economic development. This strategy should be seen as complementary to the grid expansion plans. To increase development of small-scale generation in rural areas, Rwanda will:

- Encourage private sector involvement through performance-based grants and incentives for consumer finance;
- Maximize energy project potential through high load factors and appropriate maintenance; and
- Build consumer confidence through demonstration and product standards.

An evaluation of this Green Growth and Climate Change Strategy was assessed and evaluated in 2018 by the GGGI in consultation with concerned stakeholders.

Results of the evaluation reveal that:

Program 5: Low Carbon Energy Mix Powering the National Grid

Slow progress is reported in the implementation of the action to reduce oil fuel electricity generation which has been reduced from 28.0% (52MW oil: 185MW total) to 26.5% (57.8MWoil: 218MW total) in 2017 whereas no strategy has been put in place to phase out electricity generation from peat. However, private investment incentives were put in place and have resulted in a slight increase in IPP generated electricity from 38.7% (73IPPs:190MW total) in 2016 to 52% (109.6MW of 210.9 total) in 2017.

Key observations: The low carbon energy mix for powering the grid remains relevant and critical to national strategic objective for achieving low carbon and climate change resilience. Clearly there are challenges affecting the effectiveness and efficiency of the actions in view of slow and low levels of achievement. On the other hand, it is evident that the government is making all efforts to increase energy generation for the national grid from renewable sources, especially hydropower. It is not possible to quantify efficiency of

Official Use Only

execution as data on returns of investments are not available.

Program 6: Sustainable small scale energy installation in rural areas

The evaluation shows none of the 3 actions achieved significant changes from the progress figures of 2015. Although there were 8 new off grid solar investors into the market, no new investors were forthcoming either in hydro or in on-grid solar power. Moreover, it would appear that 38 companies left the biogas business while 41 left the charcoal market. It is not clear whether the failures were a result of consumers changing to liquid natural gas (LNG) due to incentives put in place for the latter, including VAT exemption. It is not clear what specific activities for the action to increase private sector involvement in renewable energy generation or activities undertaken to ensure high load factors of and to build consumer confidence in renewable energy installations.

Key observations: Sustainable small scale energy installations in rural areas are highly relevant to national development priorities. However, it is evident that the effectiveness, efficiency, desired impact and sustainability are in question. It is recommended that relevant institutions be engaged in dialogue to identify the barriers to the execution of the actions.

This project contributes to the realization of the clean energy related objectives and targets of this specific policy.

2.1.4. The National Biodiversity Policy (2011)

The National Biodiversity Policy recognizes that Rwanda's viability is dependent on the conservation of its biological resources as these resources contribute significantly to livelihoods, food sovereignty, health, the environment, cultural diversity and the economy. Yet despite the high richness of Rwanda's biological diversity, the latter continues to reduce worryingly due to population pressure and development needs. This Policy's goal is therefore:

To conserve Rwanda's biological diversity, to sustain the integrity, health and productivity of its ecosystems and ecological processes, whilst providing lasting development benefits to the nation through the ecologically sustainable, socially equitable, and economically efficient use of biological resources. The Purpose of this policy is to: provide an overarching framework for the conservation, sustainable utilization, access to biodiversity resources and fair and equitable sharing of benefits derived from the resources.

This policy is based on fundamental principles, such as:

- Intrinsic Value. All life forms and ecological systems have intrinsic value.
- Duty of Care. All people and organizations should act with due care to conserve and avoid negative impacts on biodiversity, and to use biological resources sustainably, equitably and efficiently.
- Sustainable Use. The benefits derived from the use of Rwanda's biological resources are dependent upon:
  - Maintaining the ecological integrity of the natural systems;
  - Minimizing or avoiding the risk of irreversible change induced by humans;
  - Adequate investments to ensure conservation and sustainable use of biodiversity; and
  - Avoiding or minimizing adverse impacts of the use of non-renewable resources on biodiversity.
- The Fair and Equitable Distribution of Benefits.
- Full Cost-Benefit Accounting. Decision-makers and users of biological resources will be guided by economic approaches which assess the full social and environmental costs and benefits of projects, plans and policies that impact upon biodiversity, and which internalize costs borne to the environment and to society.

Official Use Only

- Informed and Transparent Decision-Making.
- The Precautionary Principle. Where there is a threat of significant reduction or loss of biological diversity but inadequate or inconclusive scientific evidence to prove this, action should be considered to avoid or minimize threats.
- Accountability and Transparency. Those making and implementing decisions relating to the conservation and use of biodiversity in Rwanda will be accountable to the public for their actions through explicit, justifiable processes.
- Subsidiarity. Governance responsibilities belong at the level at which they can be most effectively carried out.
- Participation. Interested and affected individuals and groups will have an opportunity to participate in decisions about the ways in which biological resources are conserved and used.
- Recognition and Protection of Traditional Knowledge, Practices and Cultures. Coordination and Cooperation. An enabling framework will be provided for the future coordination and cooperation of biodiversity-related activities in Rwanda, in the East African sub-region, and globally.
- Integration. The conservation and sustainable use of biodiversity will be integrated strategically at all levels into national, district, local and sectoral planning, programs, andpolicy efforts.
- Global and International Responsibilities. Rwanda has a shared responsibility for ensuring the conservation and sustainable use of biodiversity.

Regarding the relevance of this policy to the project is the fact that this policy provides for the establishment of a System of Protected Areas whose protection and management is guaranteedby law. In this regard, no activity can be undertaken within the limit of these Protected Areas without the specific authorization of the concerned authorities. The ESIAidentified which elements of the biodiversity could be affected by the project, and established the relevant mitigation measure.

2.1.5. The National Forest Policy (2015)

The National Forest Policy is concerned with issues related to forests, but also to ecological andeconomic safety of trees, bush research, forestry under any form and capacity building. The purpose of that policy consists in making forestry one of the pillars of the national economy and ecological viability.

The vision for the forest sector in Rwanda is that in 2024, the population's wood and other forestresource needs be met in terms of energy production for domestic purposes. The sector will significantly contribute to the household income, improvement of human and animal feeding, significant reduction of soil erosion and improvement of farmland fertility. To materialize that vision, forest coverage is expected to reach at least 30 % of the national territory and agroforestry will be practiced on at least 85 % of family farm holdings.

The National Forest Policy is focused, among others, on the following elements:

- To increase and diversify forest resources;
- To organize tree belts around natural forests;
- To classify mountains tops and slopes with steep terrain as forest land and to protect
- To prohibit wood use in brick making factories, tile kilns, charcoal factories, and scaffolds
- To rehabilitate degraded forests and woodlands;
- To manage and protect natural forests;
- To introduce and strengthen the functioning of District Forest Funds and their capacity interms of forest management.

The ESIA assessed how the forests and individual trees could be affected during project

Official Use Only

implementation, through clearing the right of way, and mitigation measures were developed to minimize the impacts. Adequate compensation will be implemented accordingly.

2.1.6. The National Wetlands Management Policy (2015)

Swamps are included in State land. They are a part of wetlands and include among others:

- Marshes and wetlands;
- Permanent lakes, rivers, water, watercourses, and brooks;
- Intermittent and regular lakes, rivers, watercourses and seasonal, brooks, includingflooding plains;
- Pools, swamps and peat bog;
- Irrigated lands, including irrigation channels and rice fields;
- Seasonal flooded agricultural land;
- Water storage areas including reservoirs and dams. Their use is notably submitted to the following conditions:
- To have prior authorization from the Minister in charge of environment or his/herdelegate before undertaking marshes and other wetland use and development project;
- To have prior authorization to introduce, import or export any animal or plant species in wetlands;
- Prohibition to plant or introduce wetlands species that are likely to undermine theenvironment, especially those derived from modified living organisms;
- Prohibition to practice fishing and hunting activities in wetlands without a written authorization;
- Prohibition to plant eucalyptus and banana trees in wetlands except for environment protection purposes;
- Prohibition to construct residences in wetlands;
- Prohibition to set up marketplaces, industries or factories, dumpsites, slaughterhouses, fuel or washing stations, garages, cemeteries or any other building likely to degrade those areas;
- Prohibition to drop any sort of waste and discharge waste that is potentially harmful for environment and health in wetlands.
- Sanctions are also provided for the ones who:
- Clears or drains a wetland without a written authorization;
- Erects, constructs, places, alters, displaces or destroys any structure that is in, under oron a wetland;
- Disturbs a wetland by practicing boring or by excavating a tunnel in a way that is likely tohave negative effects on a wetland;
- Destroys, damages or disturbs any wetland in a way that is likely to have negativeeffects on plants, animals or their habitats;
- Introduces any exotic plant or animal species that is likely to harm wetlands;
- Draws the soil from the wetland or practices bushfire in the wetland;
- Omits, neglects or refuses to protect shores against environmental degradation;
- Pursues an activity subject to suspension or prohibition.

Those who do not comply with the above-mentioned rules may be subject to the obligation of carrying out works intended to rehabilitate the degraded wetlands. The ESIA will identify the areas and extent of impacts on wetlands to be addressed through the ESMP.

Official Use Only

2.1.7. The Rwanda Energy policy (2015)

The purpose of the Energy Policy is to respond to the Rwandan population's energy challenges and needs for economic and social development within a viable and sustainable environmental framework. More specifically, the Energy Policy aims at:

- Making available affordable and sufficient energy supply throughout all the country;
- Reforming the energy service market and establishing an adequate institutional framework that will facilitate investments, service expansion, efficient pricing mechanisms and incentive measures from a financial point of view;
- Strengthening the development and use of renewable and local energy sources and technologies.
- Appropriately taking into account environmental considerations in all energy activities;
- Increasing energy efficiency and conservation in all sectors.
- Increasing education in the energy area and building gender balance in planning, implementation and monitoring of the energy sector.

The project aims at the realization of this policy's objectives.

2.1.8. The Energy Sector Strategic Plan (2018/19 – 2023/24)

Energy is central to Rwanda's economy and development plans. It supports all other sectors, including housing and urbanization, manufacturing, agro-processing, mining, tourism and IT services. As such, a well-functioning, efficient energy sector is a prerequisite of achieving the country's national goals. The Energy Sector Strategic Plan (ESSP) is vital in delivering this.

The ESSP will ensure effective delivery of the targets for the energy sector as set out under the National Strategy for Transformation (NST-1) and guide the implementation of the National Energy Policy (REP). The ESSP thus functions as a plan that serves to translate policy directives and principles into concrete measures necessary to reach medium-term targets, reflecting current resource constraints and risks and uncertainties.

This ESSP follows on from the earlier 2013/14 – 2017/18 ESSP. This new ESSP reviews the current status of the sector and outlines high-level target objectives (HLTOs). These have been determined on the basis of political ambitions and rigorous technical analysis. The HLTOs apply to all subsectors and serve to translate the policy goals laid out in the REP and NST-1 into tangible outcome indicators achievable by the end of the NST-1 period (2018/19 to 2023/24). These are:

- Generation capacity increased to ensure that all demand is met and a 15% reserve margin is maintained.
- Reliability of electricity supply improved: average number of power interruptions per year reduced to 14.2 and average number of hours without power to 91.7. Household access to electricity increased to 100%.
- Productive user access to electricity increased to 100%.
- Existing and new major national and urban roads provided with street lighting.
- Losses in the transmission, distribution networks and commercial reduced to 15%.
- Halve the number of HH using traditional cooking technologies to achieve a sustainable balance between supply and demand of biomass through promotion of most energy efficient technologies.
- Petroleum strategic reserves increased to cover three months' supply.

This Strategy takes stock of the previously existing policies, strategies and laws in relation to Energy sector in Rwanda. The project aims at the realization of this Strategy's objectives.

Official Use Only

2.1.9. The Rwanda Rural Electrification Strategy (2016)

The Government of Rwanda recognizes the vital role that electricity access plays in accelerating economic development through improving health and standards of living. Energy and particularly access to electricity is the Government's key priority. This is why significant investments have been made and progress registered led to over 84% of households getting access to electricity. More efforts need to be made for the Government to achieve the set target of 100% by 2029.

For the above targets to be met, a combination of solutions that focus on the location, income and consumption level is required instead of the traditional connection to the grid that may notbe suitable for all households. The most cost effective means for increasing access to electricity is through the use of off grid solutions that have a wide range of technologies such as a basicsolar lantern that can charge a phone or radio to a solar home system.

The Government developed this strategy with the objective of ensuring that Rwanda's households have access to electricity through the most cost effective means by developing programs that will facilitate both the end users to access less costly technologies andincrease private sector participation in the provision of these solutions. The four distinct programs in the strategy include the provision of basic solar systems as a basic necessity to the less privileged population under Ubudehe category one, the establishment of a risk mitigation facilitythat will support the private sector, mechanisms that will increase, the development of mini-gridsin suitable locations and the continued rollout of the Electricity Access Rollout Program (EARP). The Government will work with the private sector in implementing this Strategy. Particular focus will be on increasing competition within private sector which will lead to reduced costs and improved choice of technologies on the market. The Government focusses on supporting private companies to have access to different mechanisms and the Rural Electrification Strategy can be considered as 3 distinct programs:

- Government to establish a mechanism to allow low-income households to accessmodern energy services through a basic solar system as a basic necessity.
- Government to establish a risk-mitigation facility targeting the private sector such that solar products will be made available on financial terms that the population can afford.
- Mini-grids to be developed by the private sector with Government playing a key role in identifying sites and establishing a framework through which these can become financially viable investments.

The project aims at the realization of this Strategy's objectives.

2.2. Legislation

2.2.1. Constitution of the Republic of Rwanda

The Constitution was adopted by Rwandans during the Referendum of 26 May 2003 andrevised in 2023. It provides that clean and healthy environment is a right to everyone (Art 22). However, the Article 53 of the same Constitution stipulates that everyone has the duty toprotect, safeguard and promote the environment; the State ensures the protection of the environment; and a specific law determines modalities for protecting, conserving and promoting the environment.

Regarding the right to property, the Constitution of Rwanda is very clear:

Article 34 on right to private property, stipulates that everyone has the right to private property, whether individually or collectively owned; private property, whether owned individually or collectively, is inviolable. The right to property shall not be encroached upon except in public interest and in accordance with the provisions of the law. Whereas Article 34 is related to Right to private ownership of land and says: "Private ownership of land and other rights related to landare granted by the State. A law determines modalities of concession, transfer and use of land". And the Article 44 on the Respect for State property says that everyone has a duty to respect State property. State property is composed of public and private property

Official Use Only

of the State, as well as the public and private property of decentralized Government entities and public institutions with legal personality; Public State property is inalienable unless there has been prior transfer thereof to the private State property in accordance with the law; Any act intended to damage, destroy, embezzle and squander State property is punished by law.

Finally, the National Constitution of Rwanda prohibits to make international agreements permitting the transit or dumping, on national territory, of toxic waste and other hazardous materials likely to cause serious damage to public health and the environment (Art. 169).

The present ESIA study is in line with the provisions of the Rwanda Constitution and the ESMP contains specifically detailed measures to take care of these provisions during all the project's implementation phases.

2.2.2. Law on Environment (N°48/2018 of 13/08/2018)

The Law on Environment defines Environment as: a diversity of things made up of natural and built environment, including chemical substances, biodiversity as well as socio-economic activities, cultural, aesthetic and scientific.

The law defines also key principles on which the environmental protection is based, including: Precautionary principle (Art 3); Principle of environmental sustainability (Art 4); Polluter pays principle (Art 5); Principle of information dissemination and incentives for environmental conservation (Art 6); Article 7: Principle of cooperation (Art 7).

The Law provides for the use, management and protection of key environmental resources such as: soil and subsoil resources (Art 10); water resources (Art 11 & 12).

Under the Chapter IV on the conservation and protection of built environment, the law provides for the management of different types of wastes, including: liquid waste (Art 17); solid waste (Art18); hazardous and toxic waste (Art 19); and electronic waste (Art 20).

Chapter V of this law provides for obligations of the state, decentralized entities and local communities with regard to the protection, conservation and promotion of environment.

Regarding the procedures related to environmental management, Art 30 specifies that a Ministerial Order establishes the list of projects that must undergo Environmental Impact Assessment (EIA) and defines also its process and procedures and delivery of authorization before project implementation. Similarly for the list of policies and programs that must undergo Strategic Environmental Assessment (SEA) (Art 31). Art. 32 stipulates that every project that may have significant impact on the environment must undergo an environmental audit (EA) during and after its implementation. The list of projects that must undergo environmental audit is established by an Order of the Minister. An Order of the Minister also issues instructions and procedures for conducting environmental audit.

On the approval of the EIA, SEA, EA, the Art 33 states that these assessments must be approved by the Authority, or another State organ authorized in writing to do so by the Authority. If the approval is made by an authorized organ, such an organ does so on behalf of the Authority which is also responsible for its audit.

The law establishes also the list of prohibited acts:

- In wetlands and Protected Areas (Art 42);
- Related to emissions of harmful noise (Art 43);
- In protection of biodiversity (Art 44);
- In relation to chemicals and waste (Art 45)
- Similarly, the law also spells out administrative sanctions in relation to:
- Implementing a project without environmental impact assessment clearance (Art 46);
- Violation of required distances (Art 49)

Official Use Only

- Polluting public and private area (Art 50);
- Polluting public or private area by human wastes (Art 51);
- Burning waste (Art 52);
- Causing noise pollution (Art 53)
- Importing, immersing, burying, burning of waste or using any other means that causetheir decomposition (Art 57);
- Hunting, selling, injuring or killing a protected animal species (Art 58);

Finally, Chapter VII establishes measures for inspection and criminal investigation power in environmental matters. Art 61 defines staff with inspection capacity:

- Staff of the Authority;
- Staff of the City of Kigali and those of the district.

The Authority puts in place instructions governing inspection process.Article 62 establishes the powers of the inspectors as following:

- to inspect installations, factories, stores, shops and retail outlets, construction, houses, machines, vehicles, devices and products;
- to inspect records relating to the operations of the factory; 3° to take a sample of elements suspected of degrading environment, measure, take and conduct a required research;
- to provisionally suspend or ban activities or materials considered to degrade the environment;
- to impose an administrative fine provided for under this Law

Article 63 stipulates that an Order of the Minister in charge of Justice grants some of staff members of the Authority the power of criminal investigation in environmental matters.
The ESIA process responds to obligations under this law and will ensure that the key principles, as well as the relevant provisions of this law are fully complied with.

2.2.3. Law governing land in Rwanda (N° 27/2021 of 10/06/2021)

The Art 1 of this law defines its purpose:
This Law determines modalities of allocating, acquisition, transfer, use and management of landin Rwanda. It also establishes the principles applicable to rights recognised over all lands situated on Rwanda's national territory and all rights united or incorporated with land, whether naturally or artificially.
Art 3 of this law specifies that land as common heritage:
The land is part of the common heritage of all the Rwandan people: the ancestors, present and future generations. Notwithstanding the recognised rights of people, only the State has the supreme power of management of all land situated on the national territory, which it exercises in the general interest of all with a view to ensuring rational economic and social development as defined by law. Therefore, the State is the sole authority to accord rights of occupation and use of land. It also has the right to order expropriation in the public interest.
Under this law, the expropriation is defined as: an act of taking away individuals' land by the State due to public interest in circumstances and procedures provided by law and subject to fair and prior compensation;
Art. 14 defines the State land in the private domain which consists of all the land that is not included in State land reserved for public activities or infrastructures and land that does not belong to public institutions or local authorities or individuals. That land shall be comprised of the following:

- vacant lands;
- escheat lands;
- confiscated lands in respect of the provisions of this Law;

Official Use Only

- State land previously occupied by public activities removed from public domain in accordance with the laws;
- land acquired by the State through purchase, donation or expropriation for publicinterests;
- unprotected swamps;
- land occupied by State owned forests;
- land resulting from non-renewed lease issued to foreigner as provided by this Law;
- Land reserved for specific cemeteries.

Similarly, land in public domain of public institutions (Art 16) consists of land reserved for public para-statal institutions activities and infrastructures. Land in private domain of public institutions shall consist of the following categories:

- land not reserved for public activities use by public institutions;
- public institutions land previously used for public activities but which was removed from public domain in accordance with the law;
- land acquired by public institutions through purchase, donation or expropriation for publicinterests;
- Land occupied by public institutions forests.

The transfer of land from the public domain of public institutions to their private domain shall be done by an Order of the Minister in charge of land on proposal by the supervising Authority.

Regarding the enjoyment of full rights, Art 34 states that: the landowner shall enjoy full rights to exploit his/her land in accordance with the provisions of this Law and other laws. The State recognizes the right to freely own land and shall protect the landowner from being dispossessedof the land whether totally or partially, except in case of expropriation due to public interest.

The ESIA will provide an avenue for compliance with this law, while its provisions are to be addressed through the Compensation scheme and RAP.

2.2.4. Law determining the management and utilization of forests in Rwanda(Nº47bis/2013 of 28/06/2013)

The law distinguishes state and private forests. Art 5 lists the following categories as State forests:

- protected forests;
- production forests;
- Forests reserved for research.

In order to improve forest management, the law provides for issuance of a License (Art 48). However, Art 49 stipulates that the contents of each license provided for by this Law, its periodof validity and conditions for its issuance shall be determined by an Order of the Minister. A special License for clearing the whole or part of the forest so that the land it covers is used for other purposes shall be issued by the Minister (Art 52).

The ESIA will comply with this law by identifying forests requiring Minister's license for clearing for purpose of right of way for power lines.

2.2.5. Law governing biodiversity in Rwanda (N° 70/2013 of 02/09/2013)

The purpose of this Law is to determine modalities for management and conservation ofbiological diversity within Rwanda (Art 1).

Under this Law, Art 14 stipulates that an Order of the Minister shall set out a national list of ecosystems that are threatened and in need of protection and their location, which shall refer to:

- critically endangered ecosystems;
- endangered ecosystems;
- vulnerable ecosystems;

Official Use Only

- Other ecosystems with high conservation value or of high national importance.

Corollary to this article, an Order of the Minister shall also set out a list of activities prohibited in an ecosystem included on the list of ecosystems in need of protection (Art 15).
Similarly, Art 16 states equally that an Order of the Minister shall set out a list of the species in need of protection, in accordance with the following categories:

- critically endangered species;
- endangered species;
- vulnerable species;
- Other species of such high conservation value or national importance that require protection, although they are not included in the categories of critically endangered, endangered or vulnerable species.

Art 17 specifies that activities involving species or specimens included on the list of endangered or protected species are prohibited, unless authorized by the Minister. The ESIA will determine sensitive and protected ecosystems to be affected by the project, and devise alternative or mitigation measures.

2.2.6. Ministerial Order establishing the list of Protected Animals and PlantsSpecies in Rwanda (No. 007/2008 of 15/08/2008)

According to this Ministerial Order, the species of protected animals are classified into: Mammals, birds, and reptiles (Art 1) and are listed in Appendix I of this Ministerial Order. These animals should not be hunted except when there is prior authorization from competent authorities (Art 2). This list comprises:

Annex 1: - Mammals: 18 species

- Birds: 15 species
- Reptiles: 4 species

Art 4: The list of protected plants is found in appendix II. The plants mentioned in appendix II should not be uprooted or cut without prior authorization from competent authorities.
This list comprises:

2.2.7. Ministerial Order establishing the list of Projects that must undergo Environmental Impact Assessment, Instructions, Requirements and Proceduresto conduct Environmental Impact Assessment in Rwanda (No 001/ 2019 of 15/04/2019)

The Ministerial Order defines environmental impact assessment as: systematic process of identifying environmental, social and economic impacts of a project, before a decision of its acceptance is made,
Art 3 and 4 specify respectively the works, activities and projects that must undergo a full environmental impact assessment (listed on Annex I) and those that must undergo a partial environmental impact assessment (listed on Annex II). Construction of hydro-dams, hydropower plants and electrical lines of high and medium voltage are among the works / activities listed in Annex I among activities that must undergo a full EIA.

The developer, whose project is on the list of the projects that require environmental impact assessment listed in Annex I and II of this Order, selects an expert from the list of environmentalassessment practitioners published in accordance with relevant laws to conduct the study. The selected environmental impact assessment expert, on behalf of developer, submits an official application for environmental impact assessment of a proposed project to the authorized organ in form of a project brief together with proposed terms of reference for review and approval.

The ESIA is in direct compliance with the provision of this law, as this project is part of Category 1, requiring a full ESIA process.

Official Use Only

2.2.8. Prime Ministerial Order determining the responsibilities, organization and functioning of Committees in charge of the environment conservation and protection (Nº 126/03 of 25/10/2010)

The environmental Committees are established at Provincial, City of Kigali, District, Sector and Cell levels. The responsibilities of these Committees include (Art 3):

- ✓ Ensuring the implementation of the laws, policies, programs and plans relating to theprotection, conservation and promotion of the environment in Rwanda;
- ✓ Monitoring issues relating to awareness raising of the population on environmentprotection and proper land use; and
- ✓ Ensuring that persons who destroy the environment are pursued by competentinstitutions.

Every Environment Committee is in charge of overseeing the functioning of the committeebelow it in hierarchy. However, responsibilities are specific at each level, i.e. Provincial and City of Kigali (Art 4), District (Art 5); Sector (Art 6); and Cell (Art 7).

Art 8, 9, 10, 11, 12 are related to the Composition of the Committees at Provincial, Kigali City, District, Sector and Cell levels respectively; whereas their functioning is detailed under Art 13 (selection of leader); Art 14 (Term of service for Committee); Art 15 (Time and procedures for calling Committee meetings); Art 16 (Decision making process); Art 17 (Submission of Reports);and Art 18 (Cessation of service by Committee members).

The environmental committee at appropriate level (Provincial, City of Kigali, District, Sector)shall be considered for the implementation of the project, and the ESMP. They will be overseeing and providing advice on how this project is being implemented in compliance with the environmental law and report to relevant authorities any non-compliance.

2.2.9. Instruction issued by the Rwanda Environmental Management Authority (REMA) and governing Inspection Process in Environmental Matters (No 001 of 10/01/2020)

Art 2 of this Instruction defines the Inspectors as staff in charge of environmental managementin the Authority in charge of environmental management, in the City of Kigali and in all Districts.

Art 3 describes the mission of an inspector as:

- ensure that all projects, activities and products conform to applicable laws and toenvironmental standards;
- prepare inspection report and advise his / her institution on measures to be taken;
- provide the inspected person with technical recommendations related to environmental management following the inspection findings

The powers of inspectors are detailed in Art 4 as following:

1. to inspect installations, factories, stores, shops and retail outlets, construction, houses, machines, vehicles, devices and products;
2. to inspect records relating to the operations of the factory;
3. to take a sample of elements suspected of degrading the environment, measures, takeaction and propose the way forward;
4. to provisionally suspend or ban activities or materials considered to degrade the environment;
5. to impose an administrative fine provided for the relevant law;

Subsequent articles elucidate the conditions and process for inspection i.e. Inspection Notice (Art 5); Security measures (Art6); Inspection timing (Art 7).

Art 8 elaborates on key elements that an inspection needs to consider: all aspects of the project or activity with direct link to environment, including but not limited to:

Official Use Only

1. if the site for the project activity is appropriate;
2. if the project or activity has got all required clearances;
3. if the product or activity is allowed;
4. if the environmental management plan was developed and is complied with;
5. if the technical standards are complied with;
6. if the health and security measures are taken and implemented.

Art 9; 10; and 11 highlight respectively the roles, obligations and rights of the inspected person. During the inspection process, the inspector should record all key findings (these have to be countersigned by the inspected person or his / her representative on the site) (Art 12). The inspector may also take samples of products for further analyses (costs for these analyses are borne by the inspected person) (Art 13). Furthermore, the inspector issues to the head ofthe institution an inspection report, highlighting details and evidence of the activities / products harmful to the environment and that are found during the inspection as well as recommended measures (Art 14). The inspector must also keep a registry of all inspections conducted (Art 15).

Art 16 specifies that the inspected person, who has received the inspection findings notification, shall submit to the institution which has conducted the inspection note containing remedial measures as well as an implementation plan that he/she will be undertaking in order to protect the environment. This implementation plan should include indicators, targets, responsible institution and timeframes. Upon completion of execution of adopted measures, the inspected person shall officially inform the institution which inspected him/her.
Art 17 provides for an administrative fine imposed through an imposition note duly signed by theHead of the Institution or the inspector, indicating inter alia, the amount to be paid, committed fault and the legal basis as well as the scene. The fine shall be paid through a specific accountof the Fund for Environment.
The inspected person has the right to appeal against a decision after an inspection. The appeal must be addressed to the Director General of the Authority in charge of Environment, if the decision was taken by the City of Kigali or District (Art 17) or to the Minister in charge of Environment if the decision was taken by the Authority in charge of Environment (Art 18). Inboth cases, the appeal must be lodged within 15 calendar days of the receipt of the Inspection Report. With this appeal, the inspected person may request another inspection to be carried out by an independent and competent expert, at the expense of the inspected person. The Report of the Independent Expert shall be submitted to the concerned authority within 60 days (however the Independent Expert may request more days to complete the task) (Art 20).
The decision on the appeal shall be taken and communicated in writing to the person who madethe appeal within 15 calendar days from the reception of the case, or the expert's report (Art21).
In situation of the obstruction of the inspection, the person obstructing the inspection shall be charged of a fine provided by the law; if the obstruction persists, the owner shall be ordered to temporarily stop his / her activities until the person is ready to cooperate with the inspection teams.
The implementation of the project / ESMP shall be in line with the provision of this Instruction by REMA.

2.2.10. Law governing electricity in Rwanda as modified to date (No 52/2018 of13/08/2018 – modifying law No 21/2011 of 23/06/2011)

This Law governs activities of electric power production, transmission, distribution and trading within or outside the national territory of the Republic of Rwanda.
This law establishes a system of authorizing licenses for transmission, distribution and sale of electric power (Art. 5). The license is obtainable after a duly filled application and payment of a license fee as determined by the regulatory agency.
Art. 8 under this law stipulates that the regulatory agency ensures prior to the issuance of a license, that the

Official Use Only

concerned individual or institution respect the rights of users and environment protection. Under this law, there is an establishment of Universal Access Fund whose main purpose is to optimize access to electricity in all areas of the country through cost effective means and minimized support.
With regards to the Right of Way, Art 47 provides for an authorization to operate in a public or aprivate domain to be granted for electricity transmission or distribution license holder. However, the Art 48 provides for an Expropriation of right of way for public interest. The right of way is necessary to the operators in production, transmission, distribution and supply of electricity. It shall be exercised in accordance with the standards set by the regulatory agency. Expropriation shall be conducted in accordance with the Law governing expropriation for public interest.
In case of issues arising from interference with property, Article 49 provides for their settlement and stipulates that complaints from license holders regarding interference with their property, including right of way, shall be brought to the regulatory agency for handling, and when deemed necessary, to the courts in accordance with laws.

2.2.11. National Social Protection Strategy (MINALOC, 2011)

This Strategy defines social protection across two main dimensions:

- As a Social Protection Sector, which essentially comprises the system of regular and predictable cash transfers that will provide income support to those living in poverty and vulnerable to falling into poverty;
- As a means of ensuring access to other public services – such as health and education – by enabling poor households to overcome the financial barriers that they may face.

In addition, the Strategy sets out a number of social development initiatives and complementary activities to social protection focused on helping poor households graduate out of poverty. The Social Protection Strategy plays an important role in enabling the government to tackle poverty and inequality across Rwanda. It complements other sector strategies already in place and is focused on enabling Rwanda to achieve its commitments as set out in the NST1 and the Vision 2050. In recent years Rwanda has managed to achieve a good level of economic growth. However, there is still much to be achieved in poverty reduction. In 2006, almost 57 percent of the population still lived in poverty, while levels of inequality were on the rise. A number of categories of the population are particularly vulnerable to poverty including older people, those living with disabilities, young children, female-headed households, genocide survivors and the historically marginalized. Young people are a group that also need support, given the difficulties many have in finding jobs due to low skill levels.

2.2.12. Law regulating labour in Rwanda (N° 66/2018 of 30/08/2018) as amended on 08/05/2023

Labour law is fundamental in creating and maintaining employee relations, high productivity and a conducive work environment. Rwanda repealed the labour law in 2018 to align it to international best practice. The new labour law distinguishes between collective and individual labour disputes. Collective labour disputes refer to ‘disagreements between one or more employers on the one hand, and some or all employees on the other hand, which arises from collective convention or working conditions’ (Art. 3 clause 10, p.23). An individual labour dispute is defined as a disagreement between one or more employees and an employer as a result ofa breach of the employment contract concluded between them’ (Art 3 clause 11, p.24). The laws of Rwanda eliminate many potential causes of grievances in the workplace by prohibiting some forms of child labour, all forms of discrimination, forced labour, and sexual harassment. Minimum age for admission of employment is 16 years except that 13 – 15 years old children can do light work under apprenticeship. Children who are 13 years old and above can be employed for light work which does not have detrimental effect on education, health andphysical development or other aspects of child’s interest (Art.3). The labour law guarantees rightto freedom of opinion and association regarding working conditions,

Official Use Only

execution of work, and organization. This freedom includes right of employees and employers to form, join and participate in employees' or employers' associations respectively (Articles 83 and 84). These associations have to be registered under the law (Art 85) and they enjoy legal personality after publication of their Articles in the Official Gazette of the Republic of Rwanda (Art 86). Legal personality grants the associations power to file cases in courts of law, represent employees or employers, acquire property, enter into agreements with other associations.

In accordance with this law, an employer is responsible to maintain health and safety of the workers at workplace. Employer is required to keep the workplace in a common state of cleanliness and presentation of hygiene & safety necessary for the health and safety of workers.The project implementers will uphold the provisions of this Act on the rights of the workersincluding right of employees to organize themselves in a labour union. Furthermore, thecontractor shall also take note of the following orders:

- Ministerial Order Determining Conditions for Occupational Health and Safety (N°02 Of 17/05/2012)
- Ministerial Order Determining Modalities of Establishing and Functioning of Occupational Health and Safety Committees (N°01/MIFOTRA/15 Of 15/01/2015)

2.3. Institutional framework

2.3.1. Environment Institutional Actors

Ministry of Environment

The Ministry of Environment (MOE) was established to ensure the conservation, protection and development of the environment. It also ensures the safeguard of green and climate resilience for growth of the economy. MoE has the vision of protecting the environment for the safeguardof green and climate resilient Rwanda for growth of the economy. It, therefore, also overseesthe environmental aspects of the energy sector and is responsible for the coordination and implementation of legislation and policies relating to the environmental impacts of energy production and consumption.

As stipulated in the Prime Minister's Order Nº 131/03 Of 23/12/2017 determining Mission and Functions, Organizational Structure, Job Profiles, Salaries and Fringe Benefits for Employees of the Ministry of Environment (MoE), the Ministry of Environment has the following main responsibilities:

1. To develop and disseminate the environment and climate change policies, strategies and programs through:
    - to develop strategies to promote partnership and enhance capacity of private sector to invest in activities of environment and climate change for sustainable economic development;
    - to develop laws and regulations to ensure protection of the environment and conservation of natural ecosystems;
    - To develop institutional and human resources capacities in environment and climate change.
2. To monitor and evaluate the implementation and mainstreaming of environment and climate change policies, strategies and programs across all sectors, especially productive sector;
3. To oversee and evaluate institutions under its supervision by providing guidance on the implementation of specific programs to be realised by the institutions under its supervision and local government;
4. To mobilize the necessary resources for the development, protection and conservation of the environment for the climate change adaptation and mitigation.

Official Use Only

MOE is headed by the Minister, aided by the Permanent Secretary and counts 4 Technical Units, each headed by the Director General that divide responsibilities to implement the MOE'sprograms:

1. Environment and Climate Change Unit;
2. Land, Water and Forest Unit;
3. Mining Unit; and
4. Finance & Administration Unit

MOE has specific Authorities with specific mandates to implement particular programs related toEnvironment and Natural Resources management, namely:

1. Rwanda Environmental Management Authority (REMA)
2. National Land Authority (NLA)
3. Rwanda Forestry Authority (RFA)
4. Rwanda Green Fund (FONERWA)
5. Rwanda Meteorological Agency (Meteo-Rwanda)

2.3.2. Rwanda Environmental Management Authority (REMA)

Under the supervision of the Ministry of Environment, from the Law n°63/2013 of 27/08/2013 determining the mission, organization and functioning of Rwanda Environment Management Authority (REMA), REMA reserves the legal mandate for national environmental protection, conservation, promotion and overall management, including advisory to the government on all matters pertinent to the environment and climate change.

The mission of REMA is to promote and ensure the protection of the environment and sustainable management of natural resources through decentralized structures of governance and seek national position to emerging global issues with a view to enhancing the well-being of the Rwandan people.

REMA has a vision of ensuring that all sectors of the Rwandan Society value and undertake sound environmental management and rational use of natural resources in order to contribute to the national aspirations for sustainable development.

According to the said law instituting REMA, the following are the main responsibilities of REMA:

1. To implement Government environmental policy;
2. To advise the Government on policies, strategies and legislation related to the managementof the environment as well as the implementation of environment related international conventions, whenever deemed necessary;
3. To conduct thorough inspection of environmental management in order to prepare a report on the status of environment in Rwanda that shall be published every two (2) years;
4. To put in place measures designed to prevent climate change and cope with its impacts;
5. To conduct studies, research, investigations and other relevant activities in the field of environment and publish the findings;
6. To closely monitor and assess development programs to ensure compliance with the laws on environment during their preparation and implementation;
7. To participate in the preparation of activities strategies designed to prevent risks and other phenomena which may cause environmental degradation and propose remedial measures;
8. To provide, where it is necessary, advice and technical support to individuals or entities engaged in natural resources management and environmental conservation;
9. To prepare, publish and disseminate education materials relating to guidelines and laws relating to environmental management and protection and reduce environmental degradation risks;
10. To monitor and supervise impact assessment, environmental audit, strategic environmental

Official Use Only

assessment and any other environmental study. REMA may authorize in writing, any other person to analyze and approve these studies.

Also, Art 4 of the said law grants REMA powers enabling it to fulfill its mission.

These powersare:

1. To request any concerned institution or organ to submit an environment status report;
2. To visit without prior notice any project, building, industrial and business site in order to conduct inspection of activities harmful to environment.
3. To investigate offences in accordance with Law on Environment determining the modalitiesof protection, conservation and promotion of environment in Rwanda.
4. To order the suspension of activities contrary to the provisions of Law on Environment determining modalities of protection, conservation and promotion of the environment in Rwanda and other laws relating to the protection of environment.
5. To confiscate from any person various objects prohibited by laws relating to the protection of environment.
6. To receive aid, subsidies or donations; and
7. To grant awards and subsidies in order to sensitize people on environmental protection.

REMA as a parastatal is headed by the Director General, aided by the Deputy Director Generaland counts 5 Technical Units, namely:

1. Environmental Regulation & Pollution Control;
2. Research, Environmental Planning & Development;
3. Environmental Education & Mainstreaming;
4. Climate Change & International Obligations; and
5. Finance & Administration

2.3.3. Rwanda Development Board (RDB)

The Rwanda Development Board (RDB) is a government department that integrates all government agencies responsible for the attraction, retention and facilitation of investments in the national economy. RDB was established in 2009 to coordinate, spur and promote national economic development. The Executive Director's position is a cabinet-level position and the incumbent is appointed by and reports directly to the president of Rwanda. RDB measures its achievements in (a) direct foreign and domestic investments, (b) increased exports and (c) number of jobs created.

RDB is evidence that Rwanda is open for business. It is truly a one stop shop for all investors. It was set up by bringing together all the government agencies responsible for the entire investor experience under one roof. This includes key agencies responsible for business registration, investment promotion, environmental clearances, privatization and specialist agencies which support the priority sectors of ICT and tourism as well as SMEs and human capacity development in the private sector.

The RDB is independent and influential. It reports directly to the President and is guided by a Board that includes all the key Ministers (e.g., Finance, Trade, Infrastructure, and Agriculture). RDB is built with global expertise. It is modeled on international best practice examples of Singapore and Costa Rica. It has advisory and hands-on support from global entrepreneurs andexperts from Singapore Development Board, World Bank, IFC and the Office of Tony Blair.

RDB's vision is to transform Rwanda into a dynamic global hub for business, investment, and innovation. Its mission is fast tracking economic development in Rwanda by enabling private sector growth.

As an agency for tourism promotion, RDB is also the overall agency for management of nationalparks, and therefore delivers the permission to undertake any activity within the limits of those national parks.

Official Use Only

RDB deals also with issuing of EIA Certificate for investment projects in the bid to easebusiness in Rwanda. In a bid to customize the EIA related provisions of the Law on Environment (N°48/2018 of 13/08/2018) and those of the Ministerial Order establishing the list of Projects that must undergo Environmental Impact Assessment, Instructions, Requirements and Procedures to conduct Environmental Impact Assessment in Rwanda (No 001/ 2019 of 15/04/2019), RDB has issued the following guidelines in relation to EIA process.

1. *Before commencing implementation of business projects, investors are required to cross check whether their projects are required to undergo an EIA, and application for EIA Certificate should be addressed to RDB.*
2. *Procedures for obtaining an EIA Certificate*

Step 1 – Submitting Project Brief by Investor / Developer

A project brief must be elaborated in such a manner that the RDB assessor easily understands all the aspects of the project. The project brief must contain at minimum:

- Name and address of the project developer;
- Main objectives of the project;
- Main components of the project and its variants;
- Description of the proposed site of the project with an emphasis on the main characteristics of the area such as soil properties, existing planned activities in theareas, existing ecosystems such as forests, rivers, lakes, water sources, wetlands; data on weather characteristics (rainfall, etc.);
- Size and expected duration of the project;
- Planned activities for the implementation of the project with the sequencing and durationof each phase;
- Type and quantity of the product output and raw materials;
- Main materials to be used and planned staffing
- Estimated project cost (if available)
- Any drawing or photos

Step 2 – RDB conducts a site visit

RDB upon receiving the project brief plans to conduct a site visit upon which terms of reference are prepared and transmitted to the developer. These terms of reference serve as the basis for carrying out an Environmental Impact Assessment (EIA) Study for the project. Developers can also prepare their own terms of reference and condition that he/she gets approval from RDB.

Step 3 – Conducting the EIA Study

Based on the terms of reference, the developer at his / her own expenses, commissions an EIA Study and submits the findings to the RDB. A list of EIA Experts is published by the Rwanda Association of Professional Environmental Practitioners – RAPEP. Should the developer preferto use an Expert who is not registered with RAPEP, he may submit to the Authority for approval.

Step 4 – RDB issues the EIA Certificate

Once confirmation of compliance has been made by the RDB, an EIA Certificate is provided to the developer. The process takes 15 days maximum.

Time frame for EIA Certificate

- ✓ RDB submits terms of reference for EIA Study within 15 working days of the reception of the project brief;
- ✓ RDB notifies the acceptance or refusal of the choice of the experts within 5 working daysafter

Official Use Only

reception of choice of team of experts; In case of refusal, RDB provides justificationand recommends experts;

- ✓ Upon the reception of the EIA Study Report, RDB analyses the report to verify its conformity with the terms of reference. The Authority accepts to issue the EIA Certificate or requests additional information from the developer within 20 days;
- ✓ If RDB deems it necessary, it provides a public hearing notification within 15 days from the date of public notification

3. Appealing an RDB EIA Decision

Where a project is not approved, the developer may appeal against the decision of the RDB to the Ministry of Environment within 30 days from the date of the notification of the decision.

2.3.4. Rwanda Association of Professional Environmental Practitioners (RAPEP)

The Rwanda Association of Professional Environmental Practitioners (RAPEP) is a professional association comprising environmental practitioners licensed to operate in the Republic of Rwanda and recorded on its register; and established by Law No 36/2016 of 08/09/2016. The Law determines also its organization and functioning.

RAPEP has legal personality and financial and administrative autonomy (Art 3) and has currently its Head Quarters in Kigali, the Capital City of the Republic of Rwanda. Art. 6 defines the responsibilities of RAPEP as follows:

1. To gather environmental assessment practitioners;
2. To analyze and find solutions to all problems related to the environmental assessment practitioners' profession;
3. To promote professionalism and proper conduct of members of RAPEP;
4. To exchange information relating to the environmental assessment practitioners' profession;
5. To represent interests of environmental assessment practitioners and advocate for them in Rwanda and abroad.

The organs of RAPEP (art. 9) include: (1) the General Assembly; (2) the Executive Committee; and (3) the Executive Secretariat; the law determines the composition, responsibilities, functioning and decision-making processes inherent to each RAPEP's organ. The Executive Committee, composed of 5 members including the Chairperson, Deputy Chairperson, the Secretary and two (2) Advisors, is responsible for the functioning of RAPEP (art. 15). All the members of the Executive Secretariat are elected by the General Assembly for a 3-year term renewable once. However, the Executive Secretary, supported by recruited staff, is responsible for the daily management of RAPEP activities. Art. 19 defines in detail the responsibilities ofthe Executive Secretary.

Furthermore, this law (Art 24) establishes also the Regulatory Council as a statutory organ responsible for organizing and supervising the environmental assessment profession and defines also the modalities for appointment of its members, and its functioning. As per Art 28,the responsibilities of the Regulatory Council are as follows:

1. To approve regulations and guidelines governing the environmental assessmentpractitioners' profession.
2. To advise government on the organization of the profession.
3. To monitor and exercise supervision and control over environmental assessment practitioners.
4. To take measures against the environmental assessment practitioners having committed professional misconduct.
5. To submit a quarterly activity report to the Minister of environment.

Official Use Only

6. To notify RAPEP of instructions and decisions of the Regulatory Council.

Art 29 defines composition, functioning of the Regulatory Council.

It is clearly specified by this law that only licensed environmental practitioners appearing on RAPEP register are authorized to conduct an environmental impact assessment or an environmental audit (Art 31). However, a civil servant appearing on RAPEP register is not allowed to conduct environmental impact assessment and environmental assessment as longas he/she remains in service, with the exception of lecturers and researchers in institution of higher learning and universities. On the other hand, the Executive Committee of RAPEP publishes the list of environmental assessment practitioners not later than 31 July of each year, with a copy to the Minister (Art 39). The law also specifies the conditions for the registration on and removal from the RAPEP Register of Environmental Practitioners.

It further clarifies the modalities inherent to the Organization of Environmental Assessment Practitioners' Profession in Rwanda.

RAPEP commenced its activities during the first and constituting General Assembly meeting, that was called on by the Minister of Environment and held in Kigali on Feb 9th, 2017. This meeting elected also members of the RAPEP Executive Committee. Since this day, RAPEP started officially its duties, principally with the registration and delivery of licenses to the environmental practitioners fulfilling the conditions as per the law.

2.3.5. Institutional actors in the electricity sector

2.3.6. Ministry of Infrastructure (MININFRA)

The Ministry of Infrastructure (MININFRA) is responsible for four sectors: transport, energy, water and sanitation, urbanization-human settlements and housing. For the energy sector, MININFRA is in charge of the formulation, monitoring and assessment of policies and programs.Its mission is also to ensure the existence of a proper power generation capacity producing cost-effective energy, and to initiate programs to increase access to affordable energy and services. MININFRA ensures that quality standards and norms are implemented and is responsible for human resource capacities in the sector.

It supports infrastructure within the districts and is also responsible for harmonizing national infrastructure with regional plans (EAC). It has a role to promote private sector investment. MININFRA is mandated to "orient and supervise the functioning and management of public institutions, agencies and companies under the Ministry", including the Rwanda Energy Group (REG) and its subsidiaries. Under Law N°21/2011 of 23/06/2011 Governing Electricity in Rwanda, the MININFRA approves electricity tariffs.

MININFRA is composed of different departments, including in particular a Policy and Planning Department supported by a Planning Division, and overseeing sector Divisions, including an Energy Division.

- Policy & Planning Department.
- Planning Division.
- Energy Division, comprising:
    - Division Manager (1);
    - Hydropower Energy Senior Engineer (1);
    - Fossil Energy Senior Engineer (1);
    - Energy Transmission & Distribution Senior Engineer (1); and
    - Energy Economist (1)

As part of its mandate, MININFRA is also running two capacity building programs including local and international training, exchange and coaching, namely: The Young Engineers Skills Development Program (YESDP) and the Strategic Capacity Building Initiative (SCBI). They are organized in coordination with the Ministries of Education, Finance, the Ministry of PublicService and Labor, the National Capacity Building Secretariat, development partners and local universities.MININFRA and the Energy Sector Wide Approach

Official Use Only

(eSWAP) Rwanda adopted a Sector Wide Approach (SWAP) to foster the Government's and donor's efficiency in the energy sector. It was first set up in 2008 between the Government, the AfDB,the WB, the EU, Belgium and the Netherlands. The eSWAP in Rwanda encompasses all donors active in the sector under one common sector investment program and ensures cross government coordination in energy related matters. In particular, the RUEAP is part of this sector wide approach which led to the development of a least cost rollout plan, medium term priorityconnection targets, a rollout strategy and a financing policy platform. The eSWAP Secretariat is hosted by the MININFRA and composed of four staff:

- ✓ Coordinator (1);
- ✓ Energy Policy & Economics Specialist (1);
- ✓ Monitoring & Evaluation Specialist (1); and
- ✓ Office Assistant (1)

The Energy Sector Working group (ESWG)

The ESWG, chaired by the MININFRA, is a high-level coordination and advisory body for the energy sector, which includes the key stakeholders, key ministries, government agencies,development partners, private sector representatives, civil society and NGOs.

2.3.7. Rwanda Energy Group Ltd (REG)

The Rwanda Energy Group Ltd (REG) and the Water and Sanitation Corporation Ltd (WASAC) result from the split in July 2014 of the former Energy and Water Sanitation Agency (EWSA). EWSA was created in 2011 by integrating the Rwanda Energy Corporation (RECO) and the Rwanda Water and Sewerage Corporation (RWASCO). Both formed ELECTROGAZ before the national monopoly was unbundled in 2008.

REG's vision is "to be the most efficient and customer centric utility company in the region". It aims to transform the industry, its dynamic and performance, and to reinforce its customer centered operations in order "to provide sufficient and quality electricity to our customers at affordable and sustainable rates that support the socio-economic development of the country."

REG's key objectives are:

- Financial: Achieve financial solvency for the company
- Technical: Improve the scope and reliability of the supply and distribution of electricity from REG, including requests for new connections for all provinces and for all type of customers
- Operational: Increase the efficiency of REG operations, reducing cost and increasing the amount of electricity produced per employee.
- Commercial: Drastically improve the commercial operations and services of REG.

Prime Minister's Order Nº 87/03 of 16/08/2014 determined the modalities of transfer of responsibilities and property of the Energy, Water and Sanitation Authority (EWSA). Since REG Ltd has taken over the energy operations formerly under EWSA, the Group is composed of two subsidiaries, namely Energy Utility Corporation Limited (EUCL) and Energy Development Corporation Limited (EDCL).

The Energy Utility Corporation Limited (EUCL) is the subsidiary utility in charge of the day-to-day operation of generation facilities, transmission and distribution networks and the sale of electricity. EUCL plans the transmissions and distribution grids. Its current focus is geared toward consumer satisfaction, demand side management, technical and non-technical loss reduction and energy efficiency. As the sole power off taker in the country, EUCL is also responsible for negotiations and entering into Power Purchase Agreements with Independent Power Producers.

Energy Development Corporation Limited (EDCL) is the subsidiary in charge of developing new generation, transmission and energy access development projects. EDCL's mission is to develop new energy resources locally, bolster investment and develop projects in this field. It is also responsible for reviewing the power master plan and defining a least-cost power development plan. EDCL is therefore also in charge of regional

Official Use Only

power integration with neighboring countries and power pools. EDCL works closely with MININFRA.

REG is strengthening its corporate structure

As the REG structure is relatively new it faces high strategic challenges. There is therefore an ongoing effort to reinforce the corporate structures and their institutional capacity, including by recruiting talented new staff. With KPMG's support, a recruitment campaign has been launched covering all functions (Directors, Chief Engineers, Heads of Units, and officers, etc.), and is currently seeking 3 executives for the REG Ltd Holding, 20 executives for EUCL and 20 for EDCL. If necessary, during its needs assessment phase the Project will therefore take a specific approach and deeper look at the needs of this new staff for a well-structured capacity strengthening path, accompanied by national experts or international technical assistants, as part of the corporate and Project's capacity building program. In this spirit, the National Capacity Building Secretariat (NCBS) and Belgian Technical Cooperation (BTC) are also assisting EUCL, not only with incentivizing highly skilled local staff, but also through foreign technical assistance.

2.3.8. Rwanda Utilities Regulatory Agency (RURA)

Rwanda Utilities Regulatory Authority (RURA) was initially created by the Law n° 39/2001 of 13 September 2001 with the mission to regulate certain public Utilities, namely telecommunications network and/or Telecommunications services, electricity, water, removal of waste products from residential or business premises, extraction and distribution of gas and transport of goods and persons.

This Law was further reviewed and replaced by Law Nº 09/2013 of 01/03/2013 establishing Rwanda Utilities Regulatory Authority (RURA) and determining its mission, powers, organizationand functioning. This Law gives to RURA the mandate to regulate:

- Telecommunications, information technology, broadcasting and converging electronic technologies including the internet and any other audiovisual information and communication technology;
    - Postal services;
    - Renewable and non-renewable energy, industrial gases, pipelines and storage facilities;
    - Water;
    - Sanitation;
    - Transport of persons and goods;
    - Radiation Protection; and
    - Other public utilities, if deemed necessary.

The same Law gives the Authority a legal personality, financial and administrative autonomyin the fulfillment of its mandate. The Authority plays a pivotal role between the policy maker, licensed service providers and consumers. The Authority reports to the Office of the Prime Minister and it coordinates with line ministries responsible for each regulated sector in executingits functions.

In addition to the law creating RURA, there is a number of other legal and regulatory instruments which help RURA to discharge its responsibilities in each specific sector to be regulated. In the same vein, the Authority has the mission to ensure fair competition, promoting and protecting consumers' interests and rights in regulated sectors.

To be able to regulate public utilities, the Law Nº 09/2013 of 01/03/2013 gives to the Authority the following missions:

- To set up necessary guidelines in order to implement laws and regulations in force;
- To ensure compliance by public utilities with the provisions of laws and regulations governing

Official Use Only

the regulated sectors in an objective, transparent and non-discriminatory manner;

- To ensure the continuity of service delivery by the licensed or authorized service providers and the preservation of public interest;
- To protect users' and operators' interests by taking measures likely to guarantee effective, sound and fair competition in the regulated sectors within the framework of applicable laws and regulations;
- To protect and promote consumers' interests;
- To promote the availability, accessibility and affordability of regulated services to all consumers including low income, rural and disadvantaged consumers;
- To promote efficient development of regulated sectors in accordance with Government economic and financial policy;
- To promote and enhance general knowledge, sensitization and awareness of theregulated sectors including but not limited to:
- Promote and protect the rights and obligations of consumers and service providers;
- Issuing permits, authorizations and licenses required for regulated sectors, inaccordance with the relevant laws and regulations;
- To monitor and ensure compliance by regulated network or service providers in line withtheir licenses, permits and concession obligations;
- To ensure fair competition in all regulated sectors.

To fulfill this mission, the Authority is vested with the powers including among others: carrying out investigations including inspections at service delivery sites; imposing administrative sanctions in case of a violation of laws and regulations; facilitating settlement of disputes relatedto regulated services; issuing directives to the regulated service provider as well as regulating tariffs.

2.4. International conventions and treaties

Rwanda is signatory of several international conventions or treaties with a direct link with biodiversity management and environment protection. Those are presented in Table 2.

Table 2: International Conventions to which Rwanda is party

No	Title of the Convention / Treaty	Subject of the Convention
1	Convention on Biological Diversity of 5 June 1992	Biological diversity conservation, sustainable use of its components and fair and equitable sharing of benefits resulting from genetic resource harvest
2	Cartagena protocol to the Convention on Biological Diversity on Biosafety, adopted on 29 January 2000 and entered into force on 11 September 2023	It is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health.

Official Use Only

No	Title of the Convention / Treaty	Subject of the Convention
3	Convention on International Trade in Endangered Species of Wild Fauna and Flora « CITES » of 3 March 1971	Control over international trade in species of wild fauna and flora that are, or might be, threatened with overexploitation
4	«RAMSAR Convention» on Wetlands, 1971	Convention relating to Conservation and rational use of Wetlands of International Importance, especially as waterfowl habitat and their resources
		In Rwanda, Rugezi in northern province is one protected under this convention.
5	Convention on Conservation of Wildlife Migratory Species (CMS)	Conservation of migratory species whose major portion regularly and predictably crosses over one or several boundaries of domestic jurisdiction
6	African Convention on Conservation of Nature and Natural Resources	Adoption of measures for conservation, use and development of soils, water, flora and fauna in compliance with scientific principles and in the interest of populations
7	Convention on Plant Protection among State Members of the Great Lakes Countries' Economic Community « CEPGL » of 25 February 1990	The convention aims at promoting cooperation in terms of plant protection among the CEPGL countries through its Agricultural and Animal Research Institute (IRAZ) and national bodies in charge of plant protection
8	Phytosanitary Convention for Africa of 13 September 1967	This convention aims at strengthening cooperation among African countries in fighting plants and crop products' enemies, and preventing their introduction and dissemination on national territories.
9	African Convention on Conservation of Nature and Natural Resources	To increase environment protection, to encourage conservation and sustainable use of natural resources, and to harmonize and coordinate policies
10	United Nations Framework Convention on Climate Change (UNFCCC)	To stabilize atmospheric concentration of greenhouse gases at a level that would prevent dangerous man-induced interferences with the climate system

Official Use Only

No	Title of the Convention / Treaty	Subject of the Convention
11	Kyoto Protocol [extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC)], adopted on 11 December 1997 and entered into force on 16 February 2005	The Kyoto Protocol is an international treaty which commits state parties to reduce greenhouse gas emissions, based on the scientific consensus that (part one) global warming is occurring and (part two) it is extremely likely that human-made CO_2 emissions have predominantly caused it.
12	Paris Agreement on Climate Change within the United Nations Framework Convention on Climate Change, adopted by consensus on 12 December 2015. As of February 2020, all UNFCCC members have signed the agreement, 189 have become party to it	The Paris Agreement deals with greenhouse-gas- emissions mitigation, adaptation, and finance, signed in 2016. The agreement's language was negotiated by representatives of 196 state parties at the 21st Conference of the Parties of the UNFCCC in Le Bourget, near Paris, France.
13	United Nations Convention to Combat Desertification	Its objective is to combat soil erosion and desertification in affected countries.
14	Vienna Convention for the Protection of the Ozone Layer It was agreed on 16th September 1987, and entered into force on 1st January 1989	To protect human health and environment against harmful effects resulting from or that might result from human activities that modify or may modify the ozone layer
15	Montreal Protocol on Substances that Deplete the Ozone Layer (a **Protocol** to the Vienna Convention for the Protection of the Ozone Layer)	It is an international treaty designed to protect the ozone layer by phasing out the production of numerous substances that are responsible for ozone depletion. Under the Kigali Amendment countries promised to reduce the use of hydrofluorocarbons (HFCs) by more than 80% over the next 30 years. By December 27, 2018, 65 countries had ratified the Amendment. On January 1, 2019, the Kigali Amendment to the Montreal Protocol came into force.
16	Basel Convention on the Control of Transboundary movements of hazardous Wastes and their Disposal	Control of transboundary movements of hazardous wastes and their disposal. It aims at reducing the size of those exchanges in order to protect human health and environment by establishing a control system for exports and imports of hazardous wastes as well as their disposal.
17		

Official Use Only

No	Title of the Convention / Treaty	Subject of the Convention
	Bamako Convention on the ban of the import to Africa and the control of transboundary movement and management of hazardous wastes within Africa	Bamako Convention on the Ban on the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes within Africa is a treaty of African nations prohibiting the import of any hazardous (including radioactive) waste.
18	Rotterdam Convention on promotion of shared information on hazardous chemicals Adopted on 10 September 1998 and entered into force on 24 February 2004	This is a multilateral treaty to promote shared responsibilities in relation to importation of hazardous chemicals. The convention promotes open exchange of information and calls on exporters of hazardous chemicals to use proper labeling, include directions on safe handling, and inform purchasers of any known restrictions or bans.
19	Stockholm Convention on Persistent Organic Pollutants (POPs) Signed in 2001 and effective from May 2004	Is a multilateral environmental agreement to protect human health and the environment from chemicals, known as POPs. POPs have harmful impacts on human health or on the environment. They remain intact in the environment for long periods, become widely distributed geographically and accumulate in the fatty tissue of humans and wildlife. The Convention aims to eliminate or restrict the production and use of persistent organic pollutants.
20	MINAMATA Convention on Mercury Approved by delegates representing close to 140 countries on 19 January 2013 in Geneva and adopted and signed later that year on 10 October 2013	The Minamata Convention on Mercury is an international treaty designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds.

2.5. International Environmental and Social frameworks, procedures and Guidelines

2.5.1. World Bank's Environmental and Social Standards (ESSs) applicable to the project

The present project implementation is funded by the World Bank and therefore needs to comply with the WB's Environmental and Social Standards. Table 3 below summarizes standards triggered by the project and borrower requirements:

Table 3: World Bank's Environmental and Social Standards applied to the project

SN	World Bank ESS	Objectives	Borrower Requirements
1	**ESS1: Assessment and Management of Environmental and Social Risks and Impacts**	Identify, evaluate, and manage the environmental and social risks and impacts of the project in a manner consistent with the ESS1; Adopt a mitigation hierarchy approach to avoid, minimize (reduce), mitigate, and compensate (offset); Utilize national environmental and social institutions, systems, laws, regulations and procedures in the assessment, development, and implementation of projects, whenever appropriate.	Use and strengthening of the Borrower's environmental and social framework for the assessment, development, and implementation of World Bank-financed projects as appropriate.
2	**ESS2: Labor and Working Conditions**	Promote safety and health at work; Promote the fair treatment, non-discrimination, and equal opportunity of project workers; Protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, by this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate; Prevent the use of all forms of forced labor and child labor; Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law; Provide project workers with accessible means to raise workplace concerns.	Prepare and adopt labor management procedures with provisions on the treatment of direct, contracted, community, and primary supply workers, and government civil servants; Terms and conditions of work, non-discrimination and equal opportunity and workers organizations: Child labor and forced labor; Requirements on Occupational Health and Safety, in keeping with the World Bank Group's Environmental, Health, and Safety Guidelines (EHSG).
3	**ESS3: Resource Efficiency and Pollution Prevention and Management**	Promoting sustainable use of resources, including energy, water, and raw materials; Avoiding or minimizing adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities; Avoiding or minimizing project-related emissions of short and long-lived climate pollutants; Avoiding or minimizing generation of hazardous and non-hazardous waste	Provide an estimate of gross greenhouse gas emissions resulting from the project (unless minor), where technically and financially feasible; Manage wastes, chemical, and hazardous materials, and contain provisions to address historical pollution; Refer to national law and good international industry practice and World Bank Groups' EHSGs
4	**ESS4: Community Health and Safety**	Anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine	Implement requirements for community health and safety regarding infrastructure, and climate change, and apply the

Official Use Only

SN	World Bank ESS	Objectives	Borrower Requirements
		circumstances; Avoid or minimize community exposure to project-related traffic and road safety risks, and hazardous materials; Have in place effective measures to address emergency events; Ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.	concept of universal access, where technically and financially feasible. Prepare and implement disease prevention and risk management plan, implement requirements for traffic and road safety, including road safety assessments and monitoring. Address risks arising from impacts on provisioning and regulating ecosystem services. Measures to avoid or minimize, water-related, communicable, and non-communicable diseases.
5	**ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement**	Avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives; Avoid forced eviction; Mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use; Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure; Conceive and execute resettlement activities as sustainable development programs, providing sufficient investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant; Ensure that resettlement activities are planned and implemented with appropriate disclosure.	Ensure that the acquisition of RoW and assets happens only after payment of compensation and resettlement has occurred. Implement community engagement and consultation, disclosure of information, and put in place a grievance mechanism.
6	**ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources**	Protect and conserve biodiversity and habitats; Apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity; Promote the sustainable management of living natural resources; Support livelihoods of local communities, through the adoption of	Implement requirements for projects affecting areas that are legally protected or designated for protection or regionally/ internationally recognized to be of high biodiversity value. Implement requirements relating to primary suppliers, where a project is purchasing natural

Official Use Only

SN	World Bank ESS	Objectives	Borrower Requirements
		practices that integrate conservation needs and development priorities.	resource commodities, including food, timber, stones, water, etc.
7	**ESS8: Cultural Heritage**	Protect cultural heritage from the adverse impacts of project activities and support its preservation; Address cultural heritage as an integral aspect of sustainable development; Promote meaningful consultation with stakeholders regarding cultural heritage; Promote the equitable sharing of benefits from the use of cultural heritage.	Put in place a chance-finds procedure. Ensure people's continued access to culturally important sites, as well as the need for confidentiality when revealing information about cultural heritage assets that would compromise or jeopardize their safety or integrity. Put in place a mechanism for fair and equitable sharing of benefits from commercial use of cultural resources. Establish provisions for archaeological sites and materials, built heritage, natural features with cultural significance, and moveable cultural heritage.
8	**ESS10: Stakeholder Engagement and Information Disclosure**	Establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, particular project-affected parties; Assess the level of stakeholder interest and support for the project and enable stakeholders' views to be taken into account in project design and environmental and social performance; Ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format; Provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond to and manage such grievances.	Preparation and implementation of a Stakeholder Engagement Plan (SEP). The SEP involves early identification of stakeholders, both project-affected parties and other interested parties, and clarification on how effective engagement takes place. Stakeholder engagement is to be conducted in a manner proportionate to the nature, scale, risks, and impacts of the project, and appropriate to stakeholders' interests. Specifies what is required for information disclosure and to achieve meaningful consultation.

Relevance / Compliance

By conducting a review of the Country's relevant legislation, community participation, andthe formulation of an ESMP in this EIA report and having found fairly robust and sufficientnational environmental legislation, the consultant has complied with the WB ESF.

Official Use Only

2.5.2. World Bank Group Environmental, Health and Safety Guidelines

2.5.2.1. Environmental, Health, and Safety General Guidelines

The Environmental, Health, and Safety (EHS) Guidelines[1] are technical reference documents with general and industry-specific examples of Good International Industry Practice (GIIP) that WB funded projects should apply. 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. The ASCENT will apply both the General EHSG and Electric Power Transmission and Distribution EHSG. The applicability of the EHS Guidelines should be tailored to the hazards and risks established for each project on the basis of the results of an environmental assessment in which site-specific variables, such as host country context, assimilative capacity of the environment, and other project factors, are considered. When host country regulations differ from the levels and measures presented in the EHS Guidelines, projects are expected to achieve whichever is more stringent. If less stringent levels or measures than those provided in these EHS Guidelines are appropriate, in view of specific project circumstances, a full and detailed justification for any proposed alternatives is needed as part of the site-specific environmental assessment. This justification should demonstrate that the choice for any alternate performance levels is protective of human health and the environment.

General Approach to the Management of EHS Issues at the Facility or Project Level: Effective management of environmental, health, and safety (EHS) issues entails the inclusion of EHS considerations into corporate-and facility-level business processes in an organized, hierarchical approach that includes the following steps:

- Identifying EHS project hazards and associated risks as early as possible in the facility development or project cycle, including the incorporation of EHS considerations into the site selection process, product design process, engineering planning process for capital requests, engineering work orders, facility modification authorizations, or layout and process change plans.
- Involving EHS professionals, who have the experience, competence, and training necessary to assess and manage EHS impacts and risks and carry out specialized environmental management functions including the preparation of project or activity-specific plans and procedures that incorporate the technical recommendations that are relevant to the project.
- Understanding the likelihood and magnitude of EHS risks, based on: The nature of the project activities, such as whether the project will generate significant quantities of emissions or effluents, or involve hazardous materials or processes; The potential consequences to workers, communities, or the environment if hazards are not adequately managed, which may depend on the proximity of project activities to people or to the environmental resources on which they depend.
- Prioritizing risk management strategies with the objective of achieving an overall reduction of risk to human health and the environment, focusing on the prevention of irreversible and/or significant impacts.
- Favoring strategies that eliminate the cause of the hazard at its source, for example, by selecting less hazardous materials or processes that avoid the need for EHS controls.
- When impact avoidance is not feasible, incorporating engineering and management controls to reduce or minimize the possibility and magnitude of undesired consequences, for example, with the application of pollution controls to reduce the levels of emitted contaminants to workers or environments.

[1] http://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/ifc+sustainability/our+approach/risk+management/ehsguidelines

Official Use Only

- Preparing workers and nearby communities to respond to accidents, including providing technical and financial resources to effectively and safely control such events, and restoring workplace and community environments to a safe and healthy condition.
- Improving EHS performance through a combination of ongoing monitoring of facility performance and effective accountability.

Official Use Only

-

Table 4: Environmental Health and Safety Guidelines

Effect	Description	Management	Measures in place
Environment			
Greenhouse Gases (GHGs)	Energy is one of the sectors that can have potential significant emissions of greenhouse gases. GHGs may be generated from direct emissions. Green House gases are gases responsible for Global Warming and include carbon dioxide (CO2); methane (CH4); nitrous oxide (N2O); hydrofluorocarbons (HFCs); perfluorocarbons (PFCs); and sulphur hexafluoride (SF6).	Promote, develop and increase use of renewable forms of energy which include hydroelectric power and solar energy which means that the impact of ASCENT is positive to the environment as it contributes to GHGs emissions reduction.	- -Hydroelectric power used and promoted - Solar system used in form of Mini grid and also solar home system were distributed across the country to remote areas to promote the renewable energy use. - Clean Cooking solutions being implemented throughout the country. - All vehicles are tested for air pollution and are given a National Police permit (Control Technic)
Hazardous Materials	Hazmats can be classified according to the hazard as explosives; compressed gases, including toxic or flammable gases; flammable liquids; flammable solids; oxidizing substances; toxic materials; radioactive	- The overall objective of hazardous materials management is to avoid or, when avoidance is not feasible, minimize uncontrolled releases of hazardous materials or accidents (including explosion and fire) during their production, handling, storage and use. - Where practicable, avoiding or minimizing the use of hazardous materials. For example, non-hazardous materials have been found to substitute asbestos in building materials, PCBs in electrical equipment, persistent organic pollutants (POPs) in pesticides	- Different dumpsites were installed to be used to treat the waste generated. - Other waste management systems used include Ministry of Health Incinerators to incinerate medical and other relevant toxic

Effect	Description	Management	Measures in place
	material; and corrosive substances.	formulations, and ozone depleting substances in refrigeration systems; - Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion; - Using engineering controls (containment, automatic alarms, and shut-off systems) commensurate with the nature of hazard; - Implementing management controls (procedures, inspections, communications, training, and drills) to address residual risks that have not been prevented or controlled through engineering measures. - Job safety analysis to identify specific potential occupational hazards and industrial hygiene surveys, as appropriate, to monitor and verify chemical exposure levels, and compare with applicable occupational exposure standards; - Hazard communication and training programs to prepare workers to recognize and respond to workplace chemical hazards.	waste, EnviroSource to manage electronic waste among others. - Waste is sorted at source, stored and collected by the waste collection and transportation companies on regular basis. - No transformers containing PCBs will be used in this project. - Asbestos sheets banned in the country -
	Reactive, flammable, and explosive materials should also be managed to avoid uncontrolled reactions or conditions resulting in fire or explosion.	- Storage of incompatible materials (acids, bases, flammables, oxidizers, reactive chemicals) in separate areas, and with containment facilities separating material storage areas; - Provision of material-specific storage for extremely hazardous or reactive materials; - Use of flame arresting devices on vents from flammable storage containers; - Provision of grounding and lightning protection for tank farms, transfer stations, and other equipment that handles flammable materials; - Selection of materials of construction compatible with products stored for all parts of storage and delivery systems, and avoiding reuse of tanks for different products without checking material compatibility;	

Effect	Description	Management	Measures in place
Waste	Any solid, liquid, or contained gaseous material that is being discarded by disposal, recycling, burning or incineration. It can be by product of a manufacturing process or an obsolete commercial product that can no longer be used for intended purpose and requires disposal.	- Establishing waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences - Establishing a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal of wastes. - Avoiding or minimizing the generation of waste materials, as far as practicable - Where waste generation cannot be avoided but has been minimized, recovering and reusing waste; - Where waste cannot be recovered or reused, treating, destroying, and disposing of it in an environmentally sound manner	
Occupational Health and Safety (OHS)			
Approach	Employers and supervisors are obliged to implement all reasonable precautions to protect the health and safety of workers. Companies should hire contractors that have the technical capability to manage the occupational health and safety issues of their employees, extending the application of the hazard management activities through formal procurement agreements.	- Eliminating the hazard by removing the activity from the work process. Examples include substitution with less hazardous chemicals, using different manufacturing processes, etc. - Controlling the hazard at its source through use of engineering controls. Examples include local exhaust ventilation, isolation rooms, machine guarding, acoustic insulating, etc. - Minimizing the hazard through design of safe work systems and administrative or institutional control measures. Examples include job rotation, training safe work procedures, lock-out and tag-out, workplace monitoring, limiting exposure or work duration, etc. - Providing appropriate personal protective equipment (PPE) in conjunction with training, use, and maintenance of the PPE. - The application of prevention and control measures to occupational hazards should be based on comprehensive job safety or job hazard analyses. The results of these analyses should be prioritized as part of an action plan based on the	- Projects/ Subprojects prepare Occupational Health and Safety Plans to manage and handle issues related to the workplace health and safety conditions. - Personnel in charge of OHS (Occupational Health and Safety) are in place.

Effect	Description	Management	Measures in place
		likelihood and severity of the consequence of exposure to the identified hazards.	
The workplace and Exit		- The space provided for each worker, and in total, should be adequate for safe execution of all activities, including transport and interim storage of materials and products. - Passages to emergency exits should be unobstructed at all times. Exits should be clearly marked to be visible in total darkness. The number and capacity of emergency exits should be sufficient for safe and orderly evacuation of the greatest number of people present at any time, and there should be a minimum two exits from any work area. - The workplace should be designed to prevent the start of fires through the implementation of fire codes applicable to industrial settings. - The employer should ensure that qualified first-aid can be provided at all times. Appropriately equipped first-aid stations should be easily accessible throughout the place of work. - Training about OHS should be provided to all workers and should consist of basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disaster, as appropriate. Any site-specific hazard or color coding in use should be thoroughly reviewed as part of orientation training. - Vibration exposure levels should be checked based on daily exposure time and data provided by equipment manufacturers.	- The OHS plan also indicates the risks associated to the workplace through the establishment of sound Risk Assessment and the Emergency Response Plan is prepared and communicated for safe exit.
Fire and Explosions	Fires and or explosions resulting from ignition of flammable materials or gases can lead to loss of property as well as possible injury or fatalities to project workers.	- Storing flammables away from ignition sources and oxidizing materials. - Providing bonding and grounding of, and between, containers and additional mechanical floor level ventilation if materials are being, or could be, dispensed in the storage area	- Fire extinguishers used and installed at each functional unit and professional fire fighters with specialized equipment from Fire brigade used in case of extensive fire.

Effect	Description	Management	Measures in place
		- Where the flammable material is mainly comprised of dust, providing electrical grounding, spark detection, and, if needed, quenching systems - Defining and labelling fire hazards areas to warn of special rules (e.g. prohibition in use of smoking materials, cellular phones, or other potential spark generating equipment) - Providing specific worker training in handling of flammable materials, and in fire prevention or suppression	
Electrical	Exposed or faulty electrical devices, such as circuit breakers, panels, cables, cords and hand tools, can pose a serious risk to workers. Overhead wires can be struck by metal devices, such as poles or ladders, and by vehicles with metal booms. Vehicles or grounded metal objects brought into proximity with overhead wires can result in arcing between the wires and the object, without actual contact.	- Marking all energized electrical devices and lines with warning signs; - Locking out (de-charging and leaving open with a controlled locking device) and tagging out (warning sign placed on the lock) devices during service or maintenance; - Checking all electrical cords, cables, and hand power tools for frayed or exposed cords and following manufacturer recommendations for maximum permitted operating voltage of the portable hand tools; - Protecting power cords and extension cords against damage from traffic by shielding or suspending above traffic areas - Appropriate labelling of service rooms housing high voltage equipment (‘electrical hazard’) and where entry is controlled or prohibited; - Establishing “No Approach” zones around or under high voltage power lines; - Conducting detailed identification and marking of all buried electrical wiring prior to any excavation work.	- For electricity, insulation is used and during the power line, maintenance or energization, there is a channel to be used managed by the outage manager to make sure that the safety is maximized.
Personal Protective Equipment	PPE is considered to be a last resort that is above and beyond the other facility controls and provides the worker with an extra level of	- Active use of PPE if alternative technologies, work plans or procedures cannot eliminate, or sufficiently reduce, a hazard or exposure; - Identification and provision of appropriate PPE that offers adequate protection to the worker, co-workers, and occasional	- Personal Protective Equipment for workers and visitors used for different projects.

Effect	Description	Management	Measures in place
	personal protection.	visitors, without incurring unnecessary inconvenience to the individual; - Proper maintenance of PPE, including cleaning when dirty and replacement when damaged or worn out. Proper use of PPE should be part of the recurrent training programs for employees; - Selection of PPE should be based on the hazard and risk ranking and selected according to criteria on performance and testing established by recognized organizations	
Accidents and Diseases monitoring		- The employer should establish procedures and systems for reporting and recording: Occupational accidents and diseases; Dangerous occurrences and incidents. These systems should enable workers to report immediately to their immediate supervisor any situation they believe presents a serious danger to life or health. - The systems and the employer should further enable and encourage workers to report to management all: Occupational injuries and near misses; Suspected cases of occupational disease; Dangerous occurrences and incidents - All reported occupational incident and diseases should be investigated with the assistance of a person knowledgeable/competent in occupational safety. The investigation should: Establish what happened; Determine the cause of what happened; Identify measures necessary to prevent a recurrence;	- Accidents prevention, control and management are specified in each OHS Plan that is prepared. - The same documents also cater for communicable diseases prevention awareness campaign.
Community Health and Safety			

Effect	Description	Management	Measures in place
Communicable and Vector borne Diseases	Health hazards typically associated with large development projects are those relating to poor sanitation and living conditions, sexual transmission and vector-borne infections. Communicable diseases of most concern during the construction phase due to labor mobility are sexually transmitted diseases (STDs), such as HIV/AIDS.	- Providing surveillance and active screening and treatment o workers; - Preventing illness among workers in local communities by Undertaking health awareness and education initiatives, fo example, by implementing an information strategy to reinforce person-to-person counselling addressing systemic factors that ca influence individual behavior as well as promoting individua protection, and protecting others from infection, by encouragin condom use. - Vector borne diseases should be addressed by: - Prevention of larval and adult propagation through sanitary improvements and elimination of breeding habitats close t human settlements; - Elimination of unusable impounded water; - Promoting use of repellents, clothing, netting, and other barrier to prevent insect bites; Use of chemoprophylaxis drugs by non immune workers and collaborating with public health officials t help eradicate disease reservoirs; - Monitoring and treatment of circulating and migratin populations to prevent disease reservoir spread; - Collaboration and exchange of in-kind services with other contro programs in the project area to maximize beneficial effects; - Educating project personnel and area residents on risks prevention, and available treatment.	- The project carries out the communicable diseases prevention and control campaign within the project area before and during the project implementation. - Labor influx is avoided by using a labor force sourced from the host community. Only a small number of specialist workers may come from outside the area (see Section 7.3.2).

2.5.2.2. Environmental, Health, and Safety Guidelines for Electric Power Transmission and Distribution

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

2.5.2.3. Specific Impacts and management

The following section provides a summary of EHS issues associated with electric power transmission and distribution that occur during the construction and operation phases of a facility, along with recommendations for their management.

Table 5: Summary of EHS Guidelines for Electric Power Transmission and Distribution

Effect	Description	Management
Design and planning phase		
Poor site selection	Poor selection of project site for the substation sites, RoW transmission and distribution lines can be an environmental degradation threat that include the destruction of sensitive ecosystems such as wetlands or protected areas	Avoid construction sites in or near sensitive ecosystems where possible. Any activity that is located within the sensitive ecosystem or protected area, should ensure that any increase in pollution levels is as small as feasible, and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment. Do not select land that contravenes the regulations of the Government of Rwanda in relation to natural resources and sensitive ecosystems Where there is no alternative for ROW in wetland ecosystems, ensure that existing water flow regimes and irrigation channels are maintained and/or re-established where they are disrupted due to works being carried out.
Technical assistance, policy and regulatory improvement	Poor planning and setting the regulations without considering environmental and social impact of the regulations. Unemployment due to the taxation increase on charcoal and decrease on the clean cooking stove due to the promotion of environmental protection through energy efficiency.	- Reviewing taxes of cook stoves equipment by putting in this sector incentives that will make the cook stove affordable to the community. - The energy source/fuel to be used in the cook stove should be tested for the emissions and the biomass with lower emissions shall be used. - Reducing the tax of LPG (*Liquefied Petroleum Gas)* which will reduce the buying price to the community, which will help to reduce the pressure on the forest. - Increasing the tax on charcoal which is massively used by the community to reduce by the half the population who depends on firewood. - People who previously should be given the alternative and priority in the promoted fuel e.g.: Clean cooking stove
Construction phase		
Environmental Impacts: Terrestrial habitat alteration; Aquatic habitat alteration; Electric and magnetic fields and hazardous materials.		
Terrestrial habitat alteration Right-of-way	**construction activities may transform habitats**, depending on the characteristics of existing vegetation, topographic features,	RoW (Right of Way) construction - Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible;

Effect	Description	Management
	and installed height of the transmission lines.	- Installation of transmission lines above existing vegetation to avoid land clearing; - Avoidance of construction activities during the breeding season and other sensitive seasons or times of day; - Revegetation of disturbed areas with native plant species; - Removal of invasive plant species during routine vegetation maintenance (see right-of-way maintenance section below). Right of way maintenance: - Unchecked growth of tall trees and accumulation of vegetation within rights-of-way may result in a number of impacts, including power outages through contact of branches and trees with transmission lines and towers; ignition of forest and brush fires; corrosion of steel equipment; blocking of equipment access; and interference with critical grounding equipment. - Implement an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs. Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response; - Avoiding clearing in riparian areas; Avoiding use of machinery in the vicinity of watercourses.
Forest Fires	If underlying growth is left unchecked, or slash from routine maintenance is left to accumulate within right-of-way boundaries, enough fuel can accumulate that may promote forest fires.	- Monitoring right-of-way vegetation according to fire risk; - Removing blowdown and other high-hazard fuel accumulations; - Time thinning, slashing, and other maintenance activities to avoid forest fire seasons; - Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; - Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.
Avian and Bat Collisions and Electrocutions	Avian collisions with power lines can occur in large numbers if located within daily flyways or migration corridors, or if groups are traveling at night or during low light conditions (e.g. dense fog). In addition, bird and bat collisions with power lines may result in	- Aligning transmission corridors to avoid critical habitats; - Maintaining 1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware; - Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats); - Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats); - Installing visibility enhancement objects such as marker balls, bird deterrents, or diverters

Effect	Description	Management
	power outages and fires.	
Aquatic Habitat Alteration	Power transmission and distribution lines, and associated access roads and facilities, may require construction of corridors crossing aquatic habitats that may disrupt watercourses and wetlands, and require the removal of riparian vegetation.	- To prevent and control impacts to aquatic habitats include: Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas); - Minimizing clearing and disruption to riparian vegetation. - Whenever possible, route transmission and distribution lines to avoid sensitive aquatic habitats such as river crossings and wetlands. - Schedule activities to avoid sensitive periods such as fish breeding or migration seasons. - Install silt fences, sediment basins, or other sediment control measures to prevent sediment-laden storm water from entering watercourses. - As soon as construction in a particular area is complete, stabilize the area by planting it with native vegetation to prevent erosion. - Design and implement a storm water management plan to control runoff and ensure that it doesn't carry sediment or other contaminants into watercourses. - Implement best practices for erosion control, including the use of erosion control mats or blankets, especially on slopes. - If vegetation removal is essential, ensure that it's minimized and restricted only to areas where construction activities will occur. - Once construction is completed, restore aquatic habitats that were temporarily disturbed. This could include re-establishing native vegetation. - Ensure that all hazardous materials, including fuels and lubricants for machinery, are stored well away from watercourses with appropriate containment measures. Also, have spill response measures in place. - Establish regular monitoring of water quality, especially turbidity levels, during construction to ensure mitigation measures are effective.
Hazardous Materials	They include insulating oils / gases (e.g. Polychlorinated Biphenyls [PCB] and sulphur hexafluoride [SF6]), and fuels, in addition to chemicals or products for wood preservation for poles and associated wood construction	- Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units; - Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. - The storage area should also have a roof to prevent precipitation from collecting in the storage area.

Effect	Description	Management
	material. The use of SF6 should be avoided due to its potential GHGs potential effect.	- Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB.
Insulating Oils and Fuels	Highly-refined, mineral insulating oils are used to cool transformers and provide electrical insulation between live components. They are typically found in the largest quantities at electrical substations and maintenance shops. Sulfur Hexafluoride (SF6) may also be used as a gas insulator for electrical switching equipment and in cables, tubular transmission lines, and transformers. SF6 may be used as an alternative to insulating oils. However, the use of SF6, a greenhouse gas with a significantly higher global warming potential (GWP) than CO2, should be minimized.	- Evaluate and prioritize the replacement of insulating oils with environmentally safer alternatives whenever feasible. - Implement rigorous protocols for the safe handling, storage, and disposal of insulating oils and fuels, ensuring compliance with relevant environmental regulations. - Conduct regular inspections and maintenance of equipment containing insulating oils to detect and address any leaks or potential hazards promptly. - Sulfur Hexafluoride (SF6) may also be used as a gas insulator for electrical switching equipment and in cables, tubular transmission lines, and transformers. - SF6 may be used as an alternative to insulating oils. However, the use of SF6, a greenhouse gas with a significantly higher global warming potential (GWP) than CO2, should be minimized. - In cases where the gas is used for applications involving high voltages (>350 KV), equipment with a low leakage-rate (<99 percent) should be used. - Establish comprehensive training programs for personnel involved in handling insulating oils and fuels, emphasizing safety procedures and environmental stewardship.
Wood Preservatives	The majority of wooden utility poles are treated with pesticide preservatives to protect against insects, bacteria, and fungi, and to prevent rot. The preservatives most commonly used for power poles are oil-based pesticides such as creosote, pentachlorophenol (PCP), and chromated copper arsenate	- Poles should be pre-treated at an appropriate facility to ensure chemical fixation and prevent leaching, and to impede the formation of surface residues at the right-of-way. - Evaluating the cost and benefit of using alternative pole materials (e.g. steel, concrete, and fiberglass); - Consider use of alternative preservatives (e.g. copper azole); - Undertake appropriate disposal of used poles. Landfill facilities should be capable of handling wastes that may have chemical leaching properties.

Effect	Description	Management
	(CCA).	
Projects Located in Degraded Airsheds or Ecologically Sensitive Areas	E.g.: National Parks, Protected wetlands and any protected area	- Ensure that any increase in pollution levels is as small as feasible and amounts to a fraction of the applicable short-term and annual average air quality guidelines or standards as established in the project-specific environmental assessment. - Relocation of significant sources of emissions outside the airshed in question, use of cleaner fuels or technologies, application of comprehensive pollution control measures, offset activities at installations controlled by the project sponsor or other facilities within the same airshed, and buy-down of emissions within the same airshed.
Occupational Health and Safety: Mainly discussed in the general guidelines		
Live Power lines	Workers may be exposed to occupational hazards from contact with live power lines during construction, maintenance, and operation activities.	- Only allowing trained and certified workers to install, maintain, or repair electrical equipment; - Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines; - Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards; - Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation, or the energized part is properly insulated from the worker and any other conductive object or the worker is properly isolated and insulated from any other conductive object (live-line work); - Where maintenance and operation are required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan; - Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities; - Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.
Working at height on poles and structures	Workers may be exposed to occupational hazards when working at elevation during	- Testing structures for integrity prior to undertaking work;

Effect	Description	Management
	construction, maintenance, and operation activities.	- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures, inspection, maintenance, and replacement of fall protection equipment and rescue of fall-arrested workers, among others; - Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7 meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point; Installation of fixtures on tower components to facilitate the use of fall protection systems; - Provision of an adequate work-positioning device system for workers; Connectors on positioning systems should be compatible with the tower components to which they are attached; Hoisting equipment should be properly rated and maintained, and hoist operators properly trained; - Safety belts should be of not less than 16 millimeters (mm) (5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibres become evident; When operating power tools at height, workers should use a second (backup) safety strap; - Signs and other obstructions should be removed from poles or structures prior to undertaking work; - An approved tool bag should be used for raising or lowering tools or materials to workers on structures.
Electric and magnetic fields Electric and magnetic fields (EMF)	Electric utility workers typically have a higher exposure to EMF than the general public due to working in proximity to electric power lines.	- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities; - Training of workers in the identification of occupational EMF levels and hazards; - Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers; - Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the International Commission on Non-Ionizing Radiation Protection (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

Effect	Description	Management
Exposure to chemicals	They include handling of pesticides (herbicides) used for wooden pole preservation, and exposure to PCB in transformers and other electrical components.	- Train personnel to apply pesticides and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required; - Respect post-treatment intervals to avoid operator exposure during treated wooden poles handling; - Ensure hygiene practices are followed to avoid exposure of family members to pesticide residues. - Contamination of soils, groundwater, or surface water resources, due to accidental spills during transfer, mixing, and storage of pesticides should be prevented by following the hazardous materials storage and handling recommendations presented in the General EHS Guidelines.
Community Health and Safety		
Electrocution	Hazards resulting from direct contact with high-voltage electricity or from contact with tools/device in contact with high voltage electricity.	- Use of signs, barriers (e.g., locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment and mark "no-entry" areas around transmission towers and substations; - Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock. - Ensure that all power lines are adequately insulated, minimizing risks associated with unintended contacts. - Establish a regular maintenance schedule to inspect and repair any wear and tear on power lines, towers, and related equipment to ensure they remain in safe working condition. - All personnel working near or with power lines are provided with regular safety training and are aware of the associated hazards. - Develop and disseminate emergency response procedures in case of accidental contact or other incidents involving high-voltage electricity. - Ensure that workers are equipped with appropriate personal protective equipment (PPE), such as insulated gloves, boots, and safety harnesses. - Regularly engage with nearby communities, holding sessions to educate them about the dangers and necessary precautions. - Implement a feedback system where locals can report safety concerns or incidents related to the power transmission infrastructure. - Conduct periodic safety audits to assess risks and the effectiveness of the existing safety measures. - Collaborate with local media and schools to run safety campaigns, highlighting the dangers of coming into contact with high-voltage equipment.

Effect	Description	Management
		-
Soil and Water Pollution	Water and soil pollutants represent two major categories of environmental pollution. Water- and soil-polluting substances are often due to man-made wastes such as household garbage, manufacturing and agricultural wastes, fertilizers used by farmers, oil spills, and radioactive materials.	- Regular maintenance of all vehicles and machines at regular service stations, if possible, maintenance and re-fueling of the construction equipment only on sealed and enclosed areas. - Store all liquid materials (e.g. fuel, engine oil, etc.) and lubricants in locked tanks and on sealed and roofed areas. - Store construction material as bags of cement etc. in containers in order to avoid rinsing out. - Train workers in appropriate sanitation practices - Design bunds around oil collecting system beneath transformers to prevent contamination of soil and groundwater; - Provide proper equipment (as drip pans) and implement procedures to handle transformer oil, - Provide spill-control materials to drivers and workers, in order to clean up spills, if necessary
Noise	**Noise** in the form of buzzing or humming can often be heard around transformers or high voltage power lines producing corona. distribution lines and transformer carry any known health effect	- The management measures to mitigate this impact include, during project planning stages, locating rights-of-way away from human receptors to the extent possible and use of noise barriers or noise cancelling acoustic devices should be considered as necessary. - Selecting equipment with lower sound power levels. - Installing silencers for fans. - Installing vibration isolation for mechanical equipment. - Limiting the hours of operation for specific pieces of equipment or operations, especially mobile sources operating through community areas. - Re-locating noise sources to less sensitive areas to take advantage of distance and shielding. - Reducing project traffic routing through community areas wherever possible
Ozone Depleting Substances (ODS)	Ozone, a colorless gas with a pungent odor, may also be produced. Neither the noise nor ozone produced by power	- No processes are expected to generate ozone depleting substances under the present project. However, Montreal Protocol on Substances that Deplete the Ozone Layer should be applied whenever necessary. - No new systems or processes should be installed using CFCs, halons, 1,1,1-trichloroethane, carbon tetrachloride, methyl bromide or HBFCs. HCFCs should only be considered as interim / bridging alternatives as determined by the host country commitments and regulations.20
Operation phase		

Effect	Description	Management
Electric and Magnetic Fields	Although there is public and scientific concern over the potential health effects associated with exposure to EMF (Electro Magnetic Field) (not only high-voltage power lines and substations, but also from everyday household uses of electricity), there is no empirical data demonstrating adverse health effects from exposure to typical EMF levels from power transmission lines and equipment. However, while the evidence of adverse health risks is weak, it is still sufficient to warrant limited concern.	- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure; - Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided; - If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines, substations, or transformers. Examples of these techniques include: Shielding with specific metal alloys; Burying transmission lines; Increasing height of transmission towers; Modifications to size, spacing, and configuration of conductors. - Introduce time-based work limits in areas with high EMF levels. This ensures that workers aren't exposed to high levels of EMF for prolonged periods. - Regular maintenance and upgrading of equipment can ensure that they operate efficiently, potentially reducing unnecessary EMF emissions. - Ensure a set of guidelines that dictate how and when workers should approach electrical equipment, and under what conditions work should be halted due to high EMF readings. - Periodic health screenings for workers who are regularly exposed to high levels of EMF to detect any potential health impacts. - Make public aware of any areas with elevated EMF levels to ensure they remain cautious and maintain a safe distance. - Ensure a response plan is in place for situations where EMF levels spike beyond acceptable limits. That includes evacuation protocols or immediate shutdown procedures. - Set up permanent monitoring stations in areas with high EMF exposure to ensure real-time monitoring.

2.5.2.4. Performance Indicators and Monitoring

Environment: Environmental monitoring activities should be based upon potential Environmental Health and Safety direct or indirect risks including emissions, effluents, and resource use applicable to the project among others. Monitoring frequency should be enough to provide representative data for the parameter being monitored. Monitoring data should be analysed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken.

Occupational Health and Safety: Projects should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents.

2.5.3. Rwanda EIA Guidelines and WB-ESF

Both WB-ESF and the Organic Law on Environment champion safeguarding against adverse impacts of projects on the environment and affected people. Where the borrower's country's environmental and social laws and regulations, including those laws implementing borrower's obligations under international law, are deficient, ESF provisions will take precedence. The ESF were also considered in the preparation of the EIA report.

Official Use Only

Table 6: Gap Analysis Between World Bank ESF and Rwanda National Laws

Environmental and Social Standard (ESS)	World Bank Requirements	Rwanda National Laws	Gap Analysis	Recommended Actions
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	World Bank ESF requires comprehensive Environmental and Social Impact Assessment (ESIA) that identifies and manages both environmental and social risks, including stakeholder engagement throughout the project lifecycle.	Law No. 48/2018 of 13/08/2018 (Environmental Law) mandates Environmental Impact Assessments (EIA) for projects with significant environmental risks.	Rwanda's legal framework emphasizes environmental risks through EIAs but lacks provisions on comprehensive social risk management and systematic stakeholder engagement, which is essential under ESS1. Furthermore, there are no explicit requirements for continuous engagement during project implementation. ESS1 requires ongoing stakeholder engagement, while Rwanda's EIA stops primarily at project approval.	All projects should be screened for E&S Impacts classification. The WB ESF should be used for impact classification and the national law used to determine the EIA category required (full EIA, Partial EIA or no EIA required). The Social Component should be catered for.
ESS2: Labor and Working Conditions	World Bank ESF mandates fair treatment of workers, non-discrimination, the right to organize, and a safe, healthy work environment, alongside grievance redress mechanisms for workers.	Rwanda Labor Law No. 66/2018 of 30/08/2018 covers workers' rights, including non-discrimination, protection from sexual harassment and occupational health and safety standards and abolition of forced labor and child labor among others.	While Rwanda's Labor Law aligns well with ESS2 in terms of worker rights and safety, it lacks comprehensive mechanisms for addressing worker grievances and ensuring accountability through independent monitoring.	The project will follow ESS2 and has developed labor management procedures with relevant provisions to bridge the gap. The project will also prepare the Occupational Health and Safety Plan prior to the field works. The project will comply with the Ministerial order No2 of 17/05/2012, but it will monitor wages paid.

Official Use Only

Environmental and Social Standard (ESS)	World Bank Requirements	Rwanda National Laws	Gap Analysis	Recommended Actions
				The minimum age of employment should be defined in the Labor Management Plan (LMP) as 16 years. The project should not allow any forced labor.
ESS3: Resource Efficiency and Pollution Prevention and Management	World Bank ESF promotes efficient use of resources and pollution prevention, as well as mitigating climate change through cleaner technology and efficient energy use.	Rwanda's Environmental Protection Law No. 48/2018, Article 7, addresses pollution prevention and resource efficiency, especially in industrial processes and waste management.	Rwanda's law covers general pollution control but does not explicitly address climate change mitigation or the use of cleaner technology, as mandated under ESS3. World Bank requirements call for explicit measures to enhance resource efficiency and mitigate greenhouse gas emissions, which is not fully reflected in Rwanda's current legal provisions.	The project will follow provisions of ESS3 and national requirements on resource efficiency in its activities to ensure compliance with the requirements and site specific ESMPs will be developed. The project should promote sustainable use of resources and avoid or minimize environmental pollution through the use of the Bank OS.
ESS4: Community Health and Safety	ESS4 requires a comprehensive approach to assessing and managing risks that projects pose to the health, safety, and security of affected communities, including traffic and road safety, hazardous materials management, and emergency preparedness.	Rwanda Law No. 66/2018 on Occupational Health and Safety focuses more on workplace safety but indirectly relates to community health and safety.	Gaps exist in how community health and safety are addressed under Rwandan law. While occupational health and safety are covered, Rwanda's law does not extend these protections fully to surrounding communities affected by projects. ESS4 also requires a more robust plan for emergency preparedness and response,	ESS4 will be applied regarding the anticipation and avoidance of adverse impacts on the health and safety of project-affected communities. The project will ensure that workers and the general public are not exposed to vector borne diseases, STDs and construction and operation related

Official Use Only

Environmental and Social Standard (ESS)	World Bank Requirements	Rwanda National Laws	Gap Analysis	Recommended Actions
			which is less developed in Rwanda's legal framework.	safety hazards.
ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	ESS5 provides for compensation, resettlement planning, and livelihood restoration for affected people. It also stresses the need for avoiding forced evictions and involuntary resettlement whenever possible.	Rwanda Expropriation Law No. 32/2015 requires fair compensation during expropriation processes, but it does not explicitly mandate livelihood restoration.	A significant gap exists in post-resettlement support. While Rwanda's law ensures fair compensation, it does not mandate the restoration of livelihoods or provide detailed provisions for post-resettlement assistance. ESS5 requires comprehensive resettlement planning and support beyond monetary compensation, including measures to restore economic activities for affected populations.	ESS5 will be used because it provides a wider window to explore all sorts of assistance that may need to be applied depending on site specific context, PAPs and community special circumstances, and also the livelihood is well elaborated.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	ESS6 focuses on the conservation of biodiversity, especially in critical habitats, and sustainable resource use, promoting the mitigation of environmental impacts on living natural resources.	Rwanda's Environmental Law covers biodiversity protection and sustainable management of critical habitats.	While national laws align well with ESS6 on biodiversity conservation, World Bank standards are more detailed, particularly regarding the management of critical and natural habitats. The World Bank requires more stringent measures to avoid and mitigate impacts on biodiversity, while Rwanda's laws offer general protections without as much specificity.	The national requirements will be adhered to since they accord with ESS6.
ESS8: Cultural	ESS8, Article 8.1 protects both tangible	Rwanda's Cultural Heritage	The key gap here is the lack of focus on	ESS8 will be applied as it is explicit

Official Use Only

Environmental and Social Standard (ESS)	World Bank Requirements	Rwanda National Laws	Gap Analysis	Recommended Actions
Heritage	and intangible cultural heritage, ensuring that project implementation does not harm cultural assets and requires consultation with communities regarding intangible heritage.	Law No. 15/2014, Article 7 primarily focuses on the protection of physical (tangible) cultural heritage.	intangible cultural heritage in Rwanda's law. ESS8 requires more engagement with communities to protect both tangible and intangible cultural assets, which is less emphasized in Rwanda's legal framework.	on the tangible and intangible cultural heritage properties.
ESS10: Stakeholder Engagement and Information Disclosure	ESS10 mandates continuous, meaningful engagement with stakeholders throughout the project lifecycle, including full information disclosure and grievance mechanisms.	Rwanda's Environmental Law No. 48/2018 requires public participation, but only during the project approval phase.	The gap lies in the lack of ongoing stakeholder engagement during the implementation and operation phases of projects. ESS10 emphasizes a continuous, iterative process for stakeholder consultation and feedback, while Rwanda's law does not extend engagement beyond the initial EIA process. Additionally, there is no comprehensive grievance mechanism that stakeholders can access during project implementation.	ESS10 will be used during project implementation. The Project will implement stakeholder consultations throughout the lifetime of the project, as per the prepared Stakeholder Engagement Plans.

Official Use Only

Chapter III: Description of the Project and Justification

Energy is increasingly proving to be a basic essential without which true development is not possible. So, access to energy and, in particular, to electricity is an essential driver for development due to its effect on poverty and hunger, health, education, on improving living conditions, reducing the exodus from the countryside and on the environment. Making electricityavailable in homes reduces the use of batteries and also the often-excessive use of biomass. The use of electricity of hydroelectric origin also makes it possible to prevent the production of greenhouse gases such as CO_2 caused by the burning of wood and coal for heating and cooking.

3.1. Project justification

Rwanda is a small but densely populated country of 26,338 km^2 with a population of almost 13.78 million people (2022). Recovering from the dramatic events of 1994, the country has embarked on major reforms, including the decentralization of its public administration; judiciary reform; public financial management reforms; restructuring of public institutions and capacity building of public services to strengthen service delivery. The economy has seen significant, sustained growth, with an annual average growth rate of 8.3% since 2000. GDP in 2015 was RWF 4,864 billion or $743 per capita. Agriculture contributes 33% of GDP. Great progress has been made in attracting investment and encouraging entrepreneurship. In 2017, the country ranked 42 amongst 190 world economies in the World Bank Doing Business indicators1.Sustained economic growth is targeted in coming years. Overall national objectives are in place to achieve upper middle-income status by 2035 and high-income status by 2050.

However, the economic and social transformation over the NST1 period will be driven by accelerating GDP growth from 2017 onwards, to reach an overall average growth rate of 9.1%over 2017 to 2024. Along this growth path, GDP per capita will reach USD 1,382 and GNI per capita will reach USD 1,320 by the end of the NST1 period.

The government of Rwanda recognizes the vital role that electricity access plays in accelerating economic development through improving health and standards of living. Energy and particularly access to electricity is the Government's key priority. This is why significant investments have been made and progress registered has led to over 61% of households getting access to electricity by August 2022. The installed energy capacity is today at 237 MW but is envisaged to grow at 15% rate per annum.

The national Policy's approach on access to electricity is that 52% of national population will be connected through grid extension while 48% will be connected through Off-grid. Currently off-grid connection is at 14%.

To do so, Rwanda is assigning the mission to sector stakeholders ''to create conditions for the provision of sufficient, safe, reliable, efficient, cost-effective and environmentally appropriate energy services to households and to all economic sectors on a sustainable basis". Such is alsothe focus of Rwanda's longer-term strategic frameworks. Among these national strategic frameworks is the National Strategy for Economic Transformation (NST1) for which one of the strategic goals is to expand electricity access while at the same time improving quality of supply at the lowest possible cost.

The construction of the transmission lines will therefore be a driving force for economic and social

Official Use Only

development of the country, by improving and increasing electric energy availability. Thatproject will also help to reduce fuel imports required for existing isolated thermal plants and generators. That passage towards a cleaner source of energy will certainly lead to cost saving, but also environmental gains in terms of deforestation reduction, improvement of air quality andreduction of greenhouse gases generated by the use of fossil energies.
To achieve the said objectives, the Government of Rwanda through REG/EDCL is carrying outa number of studies that will guide any future investment in the electricity network.

The overarching objective of the ESIA study is to reinforce or strengthen the Rwanda transmission network and improve the rate of access to electricity supply for the people of Rwanda. The specific objective of the project is, on one hand, to study the technical, financial, economic and environmental feasibility of the selected transmission lines & sub stations and, on the other, to prepare investment documents for the mentioned projects.
The planned 220 kV lines project will be helping to improve the quality of electricity supply in Rwanda and strengthen the backbone of the transmission network, thus providing additional capacity to cope with the growth of demand, under conditions of safety and quality in line with the requirements of the public electricity service.

3.2. Brief Description of the Project Sites and Major Environmental Challenges

The study was carried out in the following districts within the territory of Rwanda:
220kV Double Circuit Bwishyura-Kigoma transmission line (Karongi District in the Western Province and Ruhango District in the Southern Province at 56.5 km). The project areas are in two districts of Southern and Western province of Rwanda and enjoy the equatorial climate tempered by altitude, characterized by mild, stable temperatures and moderate precipitation according to a cycle of four seasons with two dry seasons (January – February / June – August) and two rainy seasons (March – May / September – December).
These areas are part of the landscape transformed by agricultural activities. No transmission line directly crosses any legally protected area. The characteristic habitats that are crossed by the different lines in the project area are mainly the woodlands of eucalyptus and grevilleas trees, coffee and banana plantations, fields of other crops (maize, beans, etc.), as well as a few marshlands and streams.

The width of the right of way (30m) for 220KV transmission lines complies with Guidelines N°01/GL/EL-EWS/RURA/2015 on Right-of-Way for Power Lines. The routes studied were aimed at avoiding sensitive environmental elements and constraints in the land crossed. There is generally a right of way of 30 meters in which no other permanent structure is allowed. Within this right of way of 30m width, all vegetation exceeding 4-5 meters in height will be eliminated including trees outside the right of way, which represent a potential risk of falling onto the lines. However, several crops, which do not exceed a height of 4-5 meters, banana trees in particular, and compatible activities such as agriculture and livestock grazing shall be permitted in the right of way area. In addition to the ground area permanently required for the construction of the pylons (324 m2 by pylon of 220kv), other areas will be necessary for electrical sub-stations, tracks, access roads and material storage area.

Official Use Only

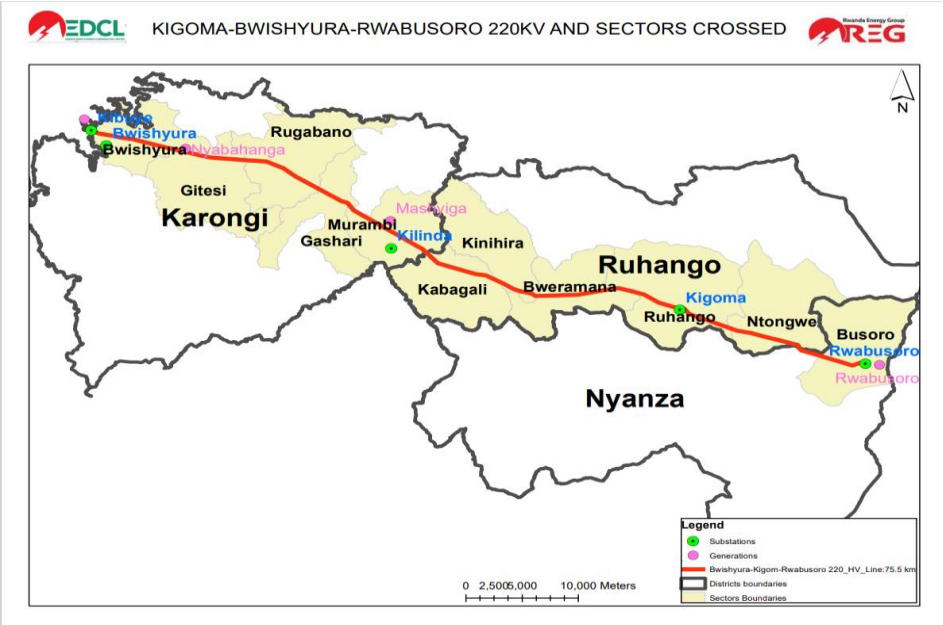


Figure 1 **Map of Rwanda districts showing location of the project**

3.3. Area of Influence

The entire project and working footprint required for the construction of the infrastructure forms the direct impact area for the project and falls well within the 30m Right of Way of the Power line. Construction and material storage yards will be located in the storage area to be designated in the C-ESMP and no worker camps will be installed because unskilled and semi-skilled workers will be recruited from the local community. The few specialist workers who may come from outside the area will use rented lodging in existing nearby towns (see Section 7.3.2). Social mitigation measures are contained within the ESMP. Broader direct impacts must be further considered, so the direct area of influence for the project is considered as the Project Area and falls within the total length of different power lines. With a directly affected area of 56.5 km length and 30m width ROW, this project will influence various activities within the project area. Along these Transmission lines within the 30m RoW, 982 households in total will be affected and among them 160 households will permanently lose a portion of their land equivalent to an estimated 1.975 ha.

3.4. General Location criteria

The general location criteria considered for the location of transmission lines within the framework of this project, and which were selected for the establishment of corridors, are presented below. They were technical, environmental and socioeconomic based, and some can be classified in more than one category:

a) To seek the most direct orientation between the starting point and the terminal in order to reduce the length of the line, thus reducing disturbances caused to the biophysical and social environment and reducing the project costs.

b) To avoid the fragmentation of the territory and the creation of residual spaces by seeking an orientation of the corridor that would comply with the landscape's general structure.

c) To exploit the territory's structural elements, such as administrative boundaries andtheir linear infrastructure (roads, electric lines, etc.), as well as interfaces among the different land use types, to minimize anticipated impacts, limit the new right-of-way and foster

Official Use Only

visual integration of the line. In addition, the existence of roads offers real advantages for the construction and maintenance of the lines.

d) To avoid visually highly exposed sections, whether on mountains summits or on exposed hillsides.

e) To bypass villages and areas where there is a concentration of households that are less compatible with the presence of electrical infrastructure and that would require to move a lot of people and high costs for compensation.

f) To avoid sensitive areas (natural reserves, wetlands, flood-prone areas, reforestation areas, industrial crops, etc.) and to use rather sections with lesser sensitivity likely to host the line with a minimum anticipated impact.

g) To avoid sections with rugged landform and steep slopes where access is more difficult for site machinery and where erosion risks are higher and can threaten the safety of the network.

A local optimization of the layout was also carried out during the field study, which helps to avoid or surround some of the most sensitive or binding elements on the crossed territory.

3.5. Power line

The width of the RoW must be at the maximum 30m for 220 kV lines. The design was determined by the extreme sag of connectors due to maximum wind effect as well as the environmental limitations such as audible sounds, electric field and radio and TV interferences.

The complete clearance of the ROW where the line crosses forested areas must be limited to a strip of 25 meters of width along the corridor in order to allow the stringing of conductors. Within the ROW, all the vegetation higher than 4 to 5 meters must be cleared including trees with potential threat outside the ROW. Moreover, when the final positioning of towers is well done, it is a factor that may even reduce the need for clearing. Notwithstanding what is previously stated, crops that do not exceed 4 to 5 meters, particularly banana trees, will be authorized as well as livestock grazing or other compatible activities. That prescription will be maintained all along the operational life of the line.

Although such an approach of maintenance aspects may be different from the methods in force among the operators, the experience of other projects in the region and internationally has shown that by engaging local communities present along the line for maintenance and safety of the line, those requirements regarding the line can be respected. That approach has also appeared to be efficient in order to reduce theft of metallic bracing and tower ground materials in addition to reducing maintenance costs related to vegetation control in the ROW. Such an agreement helps the users to maintain their activities (e.g., agriculture, livestock, plantations, etc.) on the condition that they do not interfere with the network operation.

The land acquisition will be limited to towers and substation locations. Since agriculture is based on one plantation and one manual harvest a year, the production loss will be small. Despite the fact that the area of tower base may reach 100 m² (10 m x 10 m), under normal circumstances, the lost area is limited to four concrete legs of the base, that is, in total 6.25 m²(2.5 m X 2.5 m). On soils with lower bearing capacity, each base can be between 0.5 and 1.0 m larger. Generally, soils are excavated to a depth of 3.5 m maximum.

Storage space for building materials and equipment will be used along the ROW. In addition, access roads will have to be possibly constructed by the Contractor in charge of construction works for the lines. The location and the length of such roads not being known for the time being, only general

Official Use Only

impacts related to them are described here.

3.6. Line characteristics

For the 220 kV lines, the feasibility study proposes the following technical design:

Table 7: Line characteristics

Description	Unit	Value/Parameters
Tower type: Terminal tower type MAT+0		Tension medium angle tower
Line angle	Degree	150^0 - 165^0
Structural Steel according to Standard EN 1005	quality	S235/S355
Section of phase conductor	mm^2	ACSR 240/40
Horizontal Tension per phase ACSR 240/40 conductor at 0°C	daN	2500
Type and section of earth wire OPGW 97-AL3/48-A20SA,24G.652	mm^2	144.8
Horizontal tension foreseen of earth wire at 0°C (OPGW)	daN	1800
Number of phase conductors	Pce	3
Description	Unit	Value/Parameters
Number of earth wire OPGW conductor	Pce	1
Rated voltage of the line Phase-Phase	kV	220
Minimum electrical clearance phase -phase	mm	1200
Minimum electrical clearance phase -earth/tower	mm	1200
Electrical clearance distance phase to phase vertical arrangement in mid-span	mm	4000
Electrical clearance distance phase to earth wire OPGW in mid-span	mm	2500
Spans to be considered for tower calculation		
Line span	m	350
Wind span	m	350
Minimum height dimensions of the tower & foundation type		
Tower arrangement: Two (2) lowest cross-arms at the same level		Vertical arrangement
Total height to top above ground (earth wire point)	m	25.75
Total height to lowest cross arms above ground (conductor 1+2) attachment point)	m	17.25
Total height to highest cross arm above ground (conductor 3 attachment point)	m	21.75
Type of foundation (metallic grillage filled with at least 1600 daN/m3 density soil compacted to a minimum of 2,5 bars) in normal areas without water to be considered where soil bearing capacity is min.3 bars	set	Static calculation

Official Use Only

Description	Unit	Value/Parameters
Type of foundation in swampy area with water: steel reinforced concrete foundation type flat footing, class C25 to be considered where soil bearing capacity is approx. 0,5 bar	m^3	55

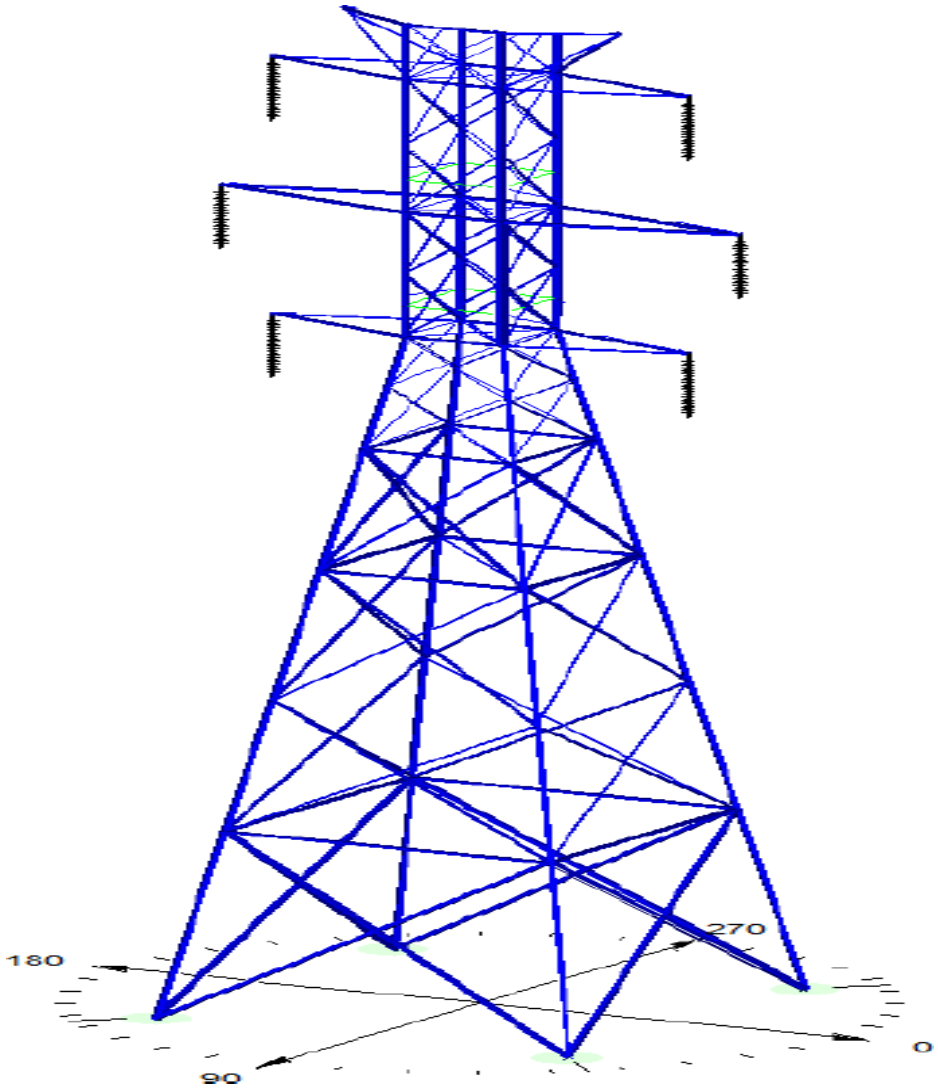


Figure 2: Schematic diagram of 220kV double circuit tower

3.7. Operation and maintenance

3.7.1. Right-of-way

The transmission line requires clearing a permanent ROW. Its width generally is 25 m wide.

Trees along the ROW must also be cleared. The width of that clearing operation is determined by the needed safety margin so that a conductor moved at 45° from the vertical line should not cause short-circuit with the vegetation. The vegetation's annual growth will have to be considered during the assessment of the average size of the vegetation in the ROW.

The regular maintenance of the ROW will be done in order to maintain clearance as described above, among towers, conductors and all the vegetation or structures. An access road of 5 m width will also be maintained where necessary. Those maintenance operations will normally take place twice a year

Official Use Only

but may vary according to local conditions and the contractors' planning.

3.8. Preliminary schedule and project costs

Based on the consultant's experience in similar projects, the construction should start after the contract signing that follows an international invitation to tender. Preconstruction activities include a geological investigation, a detailed survey of the line as well as an update of the inventory of property of the People Affected by the Project (PAP), the payment of compensation and reinstallation. Then it is expected to take at least one year to start construction activities (Site preparation, construction of storage facilities and other temporary buildings, the establishment of water and power supply systems as well as communication facilities on construction sites).

The construction will start with tower foundations followed by their erection and conductors' installation. The construction is expected to spread over 24 to 28 months after contract award to contractors and consultants.

Official Use Only

Chapter IV: Description of the Current Project Environment (Baseline State)

The description of the Current Project Environment or Baseline State provides the context from which to consider the environmental and social impacts of the proposed project. The baseline characteristics described include both environmental (climate, topography, hydrology, geology, soils, biodiversity, ecosystems, etc.) and social indicators (income, poverty, gender issues, literacy, health care, etc.). The baseline assessment is presented for each of the project areas.

4.1. Environmental Baseline for Bwishyura-Kigoma Power Line

(I) Ruhango District

4.1.1. Biophysical Baseline

4.1.1.1. Climate and Air Quality

This project site is located in the west and south part of the country. The area enjoys generally the country's climate pattern, i.e., an equatorial climate tempered by altitude, characterized by mild, stable temperatures and moderate precipitations according to a cycle of four seasons with two dry seasons (January – February / June – August) and two rainy seasons (March – May / September – December).

The site is part of the eastern lowlands, characterized by high temperatures and erratic rains. The annual rainfall averages approximately 1,170-1250mm, with temperatures varying between 18ºC and 26ºC. Air quality across the 2 Districts will be generally good outside of more settled areas. In rural homesteads, the use of wood and charcoal for cooking and heating results in proven breathing and other health issues, at the household level. There are no significant industries or mining activities that could result in poor air quality along the proposed route. Air pollution seems to occur for short periods, on a daily basis, in congested areas, resulting predominantly from exhaust fumes (being the primary source of pollution) and the morning smog caused by domestic fires.

4.1.1.2. Topography and Hydrology

The topography of Karongi District and Ruhango District are characterized by a succession of basins separated by extensions of the mountains of Central Plateau. Watersheds of all the study areas are drained by affluents of the Nyabarongo-Akagera system that belongs to the Nile Basin.

Official Use Only



Figure 3: Nyabarongo river. Caption in Murambi Sector of Karongi district

4.1.1.3. Geology and Soils

The rock substrate of this region belongs to the Karagwe – Ankole system, 1,400 – 1,000 million years old. It is made of clay stones, shales and phyllites, limestones and quartzites. Some late Proterozoic intrusive rocks produce small inselbergs. Remnants of the extensive lateritic formations dating from the Tertiary cover large areas of the eastern plateaus. Ruhango district has very fertile soils in almost all its sectors. Most of the soils are loamy and few others are sandy with loam mixture. In some boggy areas, clay soil may be found. In both districts, soil type is a mixture of sandy–clay soil.

4.1.1.4. Flora (Vegetation)

The natural vegetation in the project site is wood / forest savanna type, with predominance of acacia trees. However, this natural vegetation which was historically very dense and covering the flattened hills, is now tending to disappear completely, due to human pressure for agricultural fields, and to be replaced by crop fields and forest plantations, by the district and private individuals. Very little remaining natural vegetation cover of conservation importance remains, due to extensive human activities. Generally, there are no important conservation areas or species recorded along the proposed power line route.

Table 8: Crops fields crossed by Bwishyura-Kigoma Transmission line/ Ruhango district

Official Use Only

District	Vegetation type	Expected (Ha)	Percentage of on entire ROW	Total (Ha)
Ruhango	Banana	1.65	8.68%	19.01
	Forest	6.71	35.30%	
	Coffee	2.15	11.31%	
	Others	8.5	44.71%	
Total				**19.01**

Source: Field survey, 2023

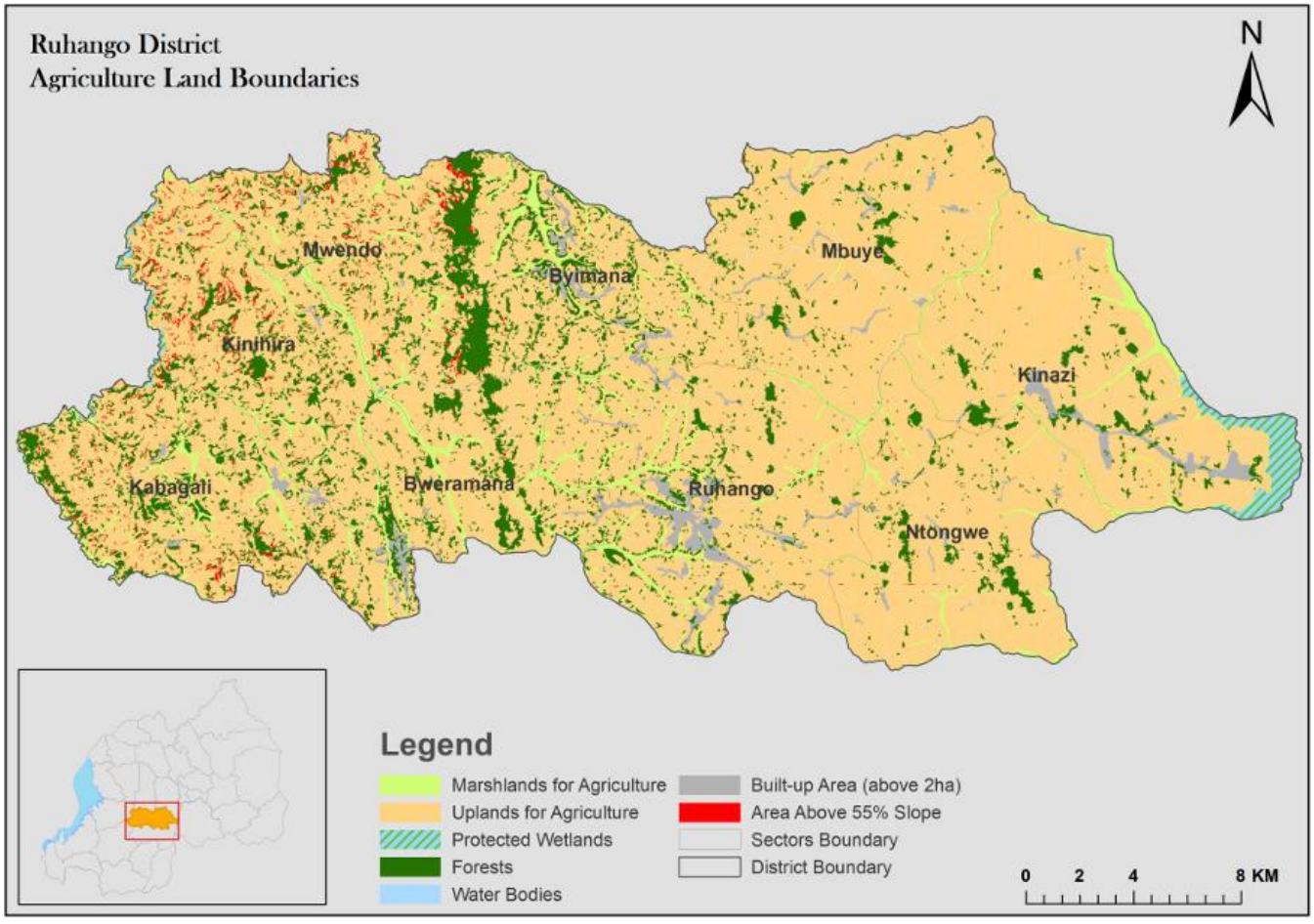


Figure 4: Land Vegetation Cover in Ruhango District. Source: ATLAS OF RWANDA Agriculture Land Boundaries

Official Use Only





Figure 5: Flora in the project area dominated with tea in the high mountain of Karongi, banana and maize in the remaining of the area.

4.1.1.5. Fauna (Wildlife)

Despite the strong anthropization[2] of the environment, wildlife still exists along the route of the power lines, as indicated in Table 9 below.

Table 9: Encountered wildlife along the Bwishyura-Kigoma Power Line

[2] the transformation of natural environments by human activity, such as agriculture, urbanization, deforestation, or industrial development.

Official Use Only

District	Observed fauna types in the project area			
	Mammal	**Bird**	**Amphibian/ Reptile**	**Fish**
Ruhango	Mice, Jackals, Bats	Black Eagles, Grey-headed Sparrow, Village Indigobird, Tropical Boubou, Tambourine Dove, African Paradise, Black-headed Heron	chameleon, gecko, a variety of frogs, a variety of snakes	No fish

The encountered wildlife species along the proposed power line are common species, with no species of particular conservation status and in particular no Papyrus Gonolek was spotted in the area.

4.1.1.5. Sensitive Habitats:

The wetland systems traversed by the proposed distribution line project range from dense continuous Papyrus to mixed stands with *Typha, Phragmites*, and *Miscanthedium* (refer to Appendix 3 for species lists). The fringes of the wetlands can also host shrubs, trees and riparian thicket, an essential component of the wetland ecosystem, providing habitat for various species of birds. The overall observation is that except for the relatively intact large wetland or swamp areas, other areas of natural vegetation have largely been transformed by human settlement and farming.



Figure 6: Nyarusave wetland in Murambi sector adjacent to Nyabarongo river

Official Use Only

As planned no Tower will be constructed in the wetland. To avoid wetland species disturbance, towers will be put on elevated hillsides on both sides of the wetlands. Moreover, the C-ESMP to be prepared will include details on construction methods to avoid wetland disturbances and any other details needed will be catered for in its MSIPs (Management Strategies and Implementation Plan).

4.1.1.6. Land Use in project area

A total of 157.22 ha will be affected by the 56.5 km long Bwishyura-Kigoma transmission Line. These are currently used for agricultural purposes, of different crop types as illustrated in the following table:

(II) Karongi District

4.1.2. Biophysical Baseline Bwishyura-Kigoma Power Line

This power line project comprises 56.5 km, 220 kV double-circuit line connecting Bwishyura power plant to Kigoma substation in Ruhango District. The project crosses 2 districts, Karongi and Ruhango. This section will focus on Karongi District.

4.1.2.1. Climate and Air Quality

Tropical climate is characterized by a succession of rainy seasons & droughts. The temperature range is 20-24°C. Rainfall increases gradually as we approach the mountain chain of the Congo-Nile covered by the Gishwati forest.

4.1.2.2. Topography and Hydrology

The relief of Karongi District is characterized by a chain of mountains and plateaus with an average altitude between 2,000 m and 1,600 m. The relief of the district is further characterized by the Congo Nile Mountains hosting Nyungwe national park. Karongi has significant water reservoirs dominated by Lake Kivu in the west and several other rivers. Some head to the Congo basin and others flow to the Nile basin. The longest source of the Nile has been identified in Twumba Sector of Karongi District.

4.1.2.3. Geology and soils

Karongi soils are basaltic, generally permeable, and rich in iron. It is an acid soil pH with an average content of clay group karyokinesis. In some places along Lake Kivu, there are sometimes derived soils phyllodes, clay, hard, containing quartz crystals and semi-strongly leached quartz which are very susceptible to erosion and therefore less fertile.

4.1.2.4. Flora (Vegetation)

The two main floral and faunal habitats found in Karongi District are Nyungwe National Park located in the North-East, and Lake Kivu located in the West. Botanists have identified at least 1,068 plant species and 140 orchids in Nyungwe National Park. As is the case with other districts, Karongi also comprises various privately owned Eucalyptus plantations found in various parts of the district. However, there are certain patches of reforested land dominated in large part by eucalyptus and grevillea.

Table 10: Vegetation crossed by the line in the district

Official Use Only

District	Vegetation type	Expected (Ha)	Percentage of on entire ROW	Total (Ha)
Karongi	Mixed Crops (beans, maize, sorghums)	13.628	37.50%	36.338
	Banana plantation	2.64	7.26%	
	Forest.	7.64	21.02%	
	Grassland	3.11	8.56%	
	Tea and coffee plantation	9.32	25.65%	

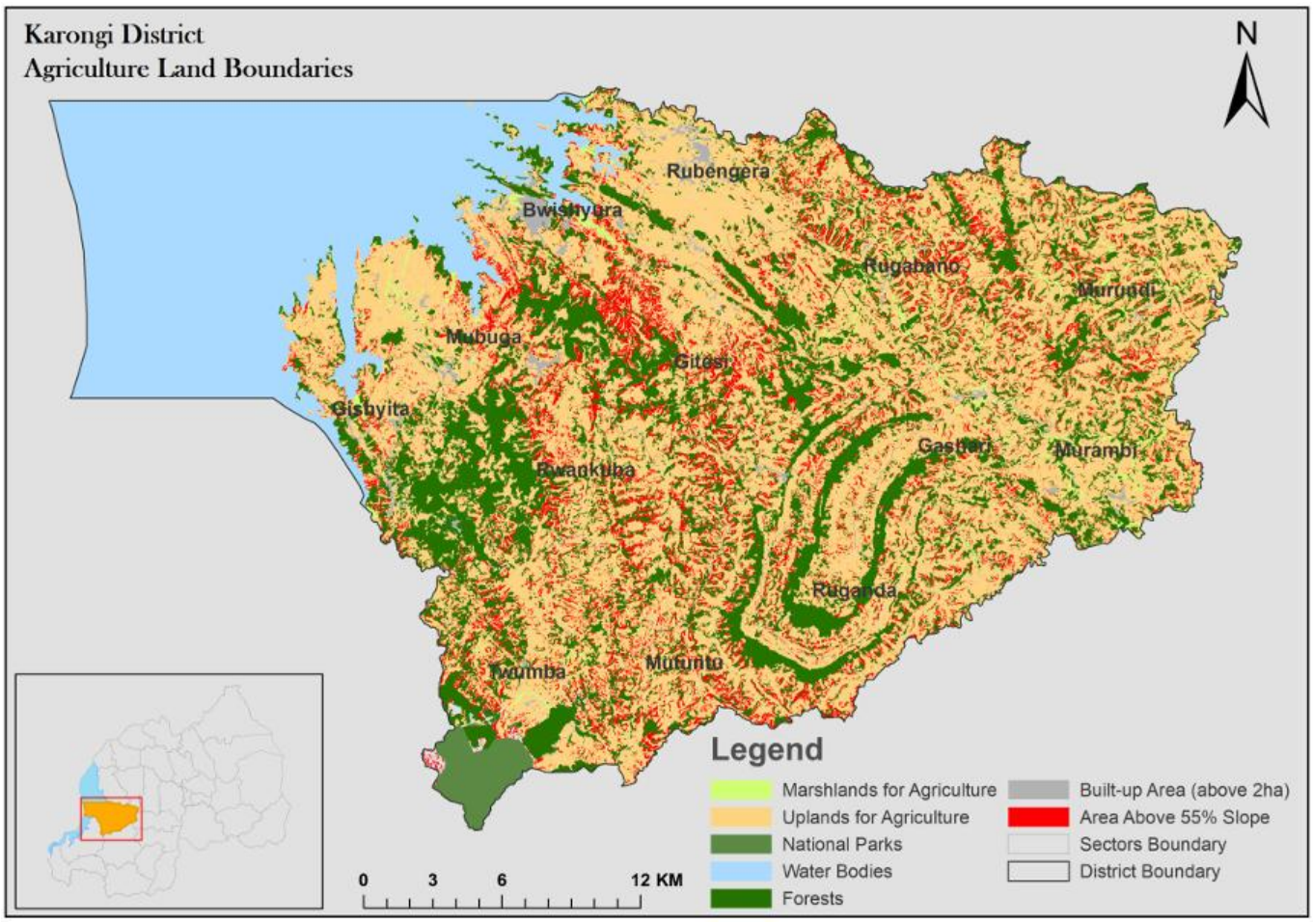


Figure 7: Vegetation/Land cover in Karongi district. Source: ATLAS OF RWANDA Agriculture Land Boundaries

4.1.2.5. Fauna (Wildlife)

The encountered wildlife along the line route is shown in Table 11 below.

Table 11: Wildlife along the Bwishyura-Kigoma Power Line

Official Use Only

District	Observed fauna types in the project area			
	Mammal	**Bird**	**Amphibian/Reptile**	**Fish**
Bwishyura-Kigoma				
Karongi	Different known mammals in Nyungwe, such as the serval cat, mongoose, congo clawless otter, leopard and species of primate.	Different bird's species including Red-collared Babbler and other Albertine Rift Endemic species. Butterflies are also a common sight	Anoline Lizard, chameleon, gecko...	Nile tilapia, ripon barbel, East African, Red-finned barb, barbus salmo

Source: Field survey, 2023

It is worth noting that the encountered wildlife species along the proposed power line corridor are common species, with no species of particular conservation status as the line will not cross the Nyungwe national park or any other area of protected biodiversity interest. Table 11 above provides the bird species in the project area, not only in the power line corridor alone, the Red-collared Babbler in the list above, was found in the big mountains of Karongi district not in the line corridor. The bird species that are there are among the species that can be found in the nearest rich biodiversity niche. The complete list of bird species in Rwanda[3].

4.2. Socio-Economic baseline of the project area

4.2.1. General conditions of the PAPs

The number of projects affected persons (PAPs) totals 3,332 for the entire project, grouped into 982 households. Seventy-five of the 982 households are in the vulnerable category. 160 PAHs will permanently lose a portion of their land equivalent to 1.975 ha where towers will be erected.

Among the household representatives interviewed, males predominated with **67**%; the remaining **33**% were females. The average number of people composing the surveyed households is 4 compared to 4.3 at the national level.

The result of the survey has shown that 69.9% of household members were active people aged between 19-65 years, and more than 89% of respondents attended at least primary school.
The household census has shown also that 7.6% of all affected households are vulnerable (75 out of 982). Within the vulnerable persons, 20 of 75 (26%) are disabled, 17 (22.6%) live with permanent illness, 20 (26%) are poor as indicated by living conditions categorization (Ibyiciro by'ubudehe) and only 18 people are representing 24% of the very old person.
Additionally, the survey has shown that 62.5% of the affected properties belong to their owners.

[3] https://www.visitrwanda.com/wp-content/uploads/2020/07/Birds_of_Rwanda_Vande_weghe.pdf

Official Use Only

Concerning employment and occupation, 55.2% of affected household heads were mainly in agriculture, 4.8% salaried, and 18.0% were self-employed.

In surveyed households, 71.3% use Electricity as their source of energy, especially in lighting, while 15.0% use Kerosene lamps and other remaining 13.2% use other source of energy such as battery, biogas, wood, etc.
Within surveyed households, 43% fetch water from pipes installed by water supply network, while 57% also get water from public tap/standpipe or fountain. Within PAPs to be affected by the project in all districts, 81.8% paid bills aggregated between 1000 and 5000 FRW and 18.2% paid bills higher than 10,000 FRW for water access/consumption.

With regards to preference in modality of compensation, 99.3% preferred to be compensated in cash and then buy related assets wherever they want, while 0.7% said that they were not able to respond to this question.

4.2.2. Magnitude of the Expected Loss

4.2.2.1. Magnitude of Expected Loss According to the area of affected land

The magnitude of the expected loss was calculated based on the below criteria:

- Those who lose land and structure/fences of less than 10% of their lands will be slightly affected.
- Those who lose the land and structure/fences of around 25-30% of their lands will be moderately affected.
- Those who will lose the land and other structures/fences of around 95% of their lands will be severely affected.

The magnitude of expected loss will be permanent loss of land and structures where some of the landowners will permanently lose his/her land. However, s/he retains the right to benefit from the salvage of construction materials by selling them or moving them to any other preferred locations without deduction from compensation. Moreover, s/he will receive full compensation as per national law and AfDB and EDCF land acquisition requirements.
The construction will not exceed two years, and the property owners are compensated before the works commence on the respective plot. Survey has shown that every household that will lose a portion of their land has other lands on separate land titles. Therefore, the project will leave nobody landless and with compensation money, households will be able to immediately restore their livelihoods either by buying replacement land or by investing in other activities.

- EDCL/RUEAP will allow them to salvage the materials and crops before construction activities.
- EDCL/RUEAP will pay them the full compensation of the whole affected land and other structures, or any assets located on the affected land.
- The owner's approval should be attained first, thereafter, the landowner is invited to be consulted regarding the compensation process in compliance with the expropriation law in public interests.

Official Use Only

4.2.3. Socio-economic baseline data for Ruhango District

Ruhango is one of seven Districts of the Southern Province in Rwanda. It covers a total surface area of 1,337 km² of which arable land is estimated at 91,930.34 ha. The average size of land cultivated per HH is 0,59 ha. The district is composed of 15 Sectors, 72 Cells and 581 Villages with a total Population of 363,339 people in the following proportion: 177,404 males and185,935 females (NISR, 2022).



Figure 8: Rural Settlements in Ruhango district

The rural area of Ruhango district is made up of rural settlements which are mainly small and dispersed communities, but in some instances, we can find densely populated settlements. It is characterized by moderate population density and a predominance of agricultural or natural landscapes. The houses are spread out, with farms, fields and forests surrounding the residential areas.

a. *Economic activities*

The district is at the 17th position in the country to have a percentage of Households involved in agriculture and livestock activities. Crop farming and livestock rearing are the district's economy's backbones whereby 77.8% of the population depend on agriculture against 72% for national average (EICV5 2021). According to EICV5, 72.3% of the HH of the district have less than 1ha of land to be cultivated.

b. *Road network*

The District of Ruhango road network is to be improved and upgraded to facilitate inter-districts and cross border trade. Rural transport networks for rural and urban accessibility shall be improved by constructing and rehabilitating more feeder roads, extending tarmac and stone paved roads, constructing and rehabilitating bridges, constructing the district roadside station and car parks and finally establish the district motorcycle modern park stations.

c. *Access to healthcare*

Ruhango District has various types of health care services. These services are defined to help citizens to access health services in clear and good conditions, the formal ones are set up from the sector to District level. On the sector level, all fifteen sectors have health centers (HC) constructedby the government and development partners. All district residents are mobilised to subscribe tohealth insurance services (mutuelle de santé) available in each health center. 96% of the population has health insurance.

Official Use Only

d. *Energy sources*

The energy sector registered great achievement in the last 5 years. However, there is still a long way to go. According to the EICV3 report, 4.3% of people in the district use electricity. Thanks to the rural electrification program, access to electric power has increased to 12.8% so far (EWSA report, February 2013). The rest use other sources for lighting like firewood, lantern, and batteries, among others. As for cooking, 96.3% of people in Ruhango use biomass, 1.9% use charcoal and 1.8% use other sources including biogas and solar energy among others.

The energy sector is a key factor in rapid economic transformation and the district targets to increase access to electricity from 4.3% (EICV3) to 70% by 2017/2018 through the installationof electric lines in rural areas serving 70% of households and connecting 100% of the households in the urban areas. The extension of streetlights in commercial centers and agglomeration settlements from 8.5 kms to 45.kms and the reduction of biomass consumption from 96% to 50% by increasing the use of modern cooking stoves from 40% to 80%, installation of biogas digesters from 125 HH to 350 HH and increase the use of solar energy in HHs and institutions from 260 HHs and 8 institutions to 450 HH and 30 Institutions.

e. *Education and literacy*

In the education sector, over the last 5 years, the adult literacy rate was increased from 35.9%to 72.9% (increase of 37%). 13 schools of twelve Years Basic Education (12YBE) and 16 schoolsof Nine Years Basic Education were constructed and equipped with scholastic materials. ICT facilities were constructed, 2488 Laptops were provided to 9 schools and the rate of computer literacy in schools increased up to 4.4%.

Gross enrollment rate in Primary school is 142% while that of secondary is 22%. This percentage beyond 100% in primary school is due to the effort in Universal primary education program. Teacher/ pupil ratio for primary is 1:55 whereas for secondary it is 1:45. The teacher qualification rate is 98% for primary schools, 65% for secondary schools, and 45% in TVETs. The performance Rate of primary and secondary increased up to 83% and 79% respectively.

Five (5) ECDCs and 43 nursery schools were constructed. The district has 77 primary schools with 3168 classrooms, 78,300 pupils and 1249 teachers. There are 40 secondary schools with 273 classrooms, 16204 students and 573 teachers. The district has so far 2 TVETS with 736 students and 132 teachers.

e. Access to clean water

The district priority is to increase rural water coverage and accessibility to people by constructing water pipelines serving the population within 9 sectors and rehabilitating existing water pipelines, constructing water boreholes serving the population in all the 9 sectors,increasing domestic.

The district focuses on improving solid and liquid waste treatment and disposal by constructing wastewater/surface water drainage system, construct wastewater treatment plants, construct landfill and solid waste dumping site, have all rural households with rubbish pits by 2016, and complete the rehabilitation of existing nonoperational water system.

f. *Poverty and vulnerability analysis*

In the last five years, the percentage of people below the poverty line has been reduced from 66% to 48.4%, meaning a reduction of 17.6%. The percentage of the population in extreme poverty is 28.3%

Official Use Only

in Ruhango District.
The district uses different approaches initiated by the Government like One cow per family (Girinka) program, *Ubudehe* program, Vision 2020 Umurenge program (VUP), and other social assistance schemes meant for genocide survivors and demobilized soldiers, implemented by FARG and RDRC. This has improved the life of District's citizens and reduced poverty.
The current situation of VUP in Ruhango is such that 6 sectors are under VUP, where the most vulnerable benefit from the whole VUP package which include direct support, public works, financial services amongothers. In the last 5 years a total of 2430 HHs benefited from the VUP package with almost 365 graduating from poverty.
Other approaches have also been used to support vulnerable people in the district, and they have had a clear effect on poverty. Through the Girinka programme, 29% of households in Ruhango received cattle. All grass-thatched houses were replaced. Umuganda delivered infrastructure such as roads and classrooms, and Ubudehe financed many projects for vulnerable people. FARG settled homeless genocide survivors, supported the education of student survivors and financed income-generating projects for survivors. Demobilized soldiers were supported with health care, vocational skills, start-up kits and housing.

g. Gender Analysis

Low understanding of Gender mainstreaming where even the term Gender is taken as a womenissue is an important challenge for district inclusive development. For this, the district has resolved to promote gender sensitive participation, in all positions and equitable access to service across all sectors of the economy.

4.2.4. Socio-economic baseline for Karongi

Based on the 2022 Population Census results, the total population in Karongi is 466,944 inhabitants of which 228,610 are male (49%) and 238,334 are females (51%). The average density attains 243 inhabitants/km² which is by far lower than the national density figure of 321 inhabitants/km². The most populated sectors are Rubengera and Bwishyura which have 58,847 and 56,871 inhabitants, respectively, while the less populated sectors are Twumba and Ruganda having respectively 17,061 and 19,328 inhabitants. Most people aged 16 and above in Karongi are independent farmers (66.5%), followed by wage farmers (13.2%), wage non-farmers (7.2%).

a. *Economic activities*

Karongi District share to the national agricultural production is still low, despite the high potential. Some crops such as maize which is far above the national average with 35% against 18%, Sorghum (9%) above the national average of (1%), Rice (2%), slightly above the national average (1%), Groundnuts (3%) above the national average of 2%, Cassava (11%) above the national average of 9%, Fruits (1%) above the national average of 0% and finally vegetables (2%) above the national average of (0%). Agriculture offers agro-business opportunities through the commercialization of crops production. These opportunities are measured by the share of harvest sold (including households selling zero crops) which is 26.7% in Karongi District i.e. above national level (20.9%). In the district, the share of harvest sold for fruits and vegetables is lower (6.4%) than that of staple crops (13.6%). The development of the agriculture sector will help to eradicate hunger among the residents and boost consumption which has a multiplier effect on the general growth of the

Official Use Only

region.Over 80% of the labor force work in the agriculture sector contributing 25% to the GDP. Agro-processors are critical and need special attention at all layers of the economy, acting as large-scale buyers of farming products and engaging in significant value creation. MINICOM works with agro-processors across varied SMEs, including essential oils, pyrethrum, coffee, maize, wheat, macadamia, pineapple, passion fruit, tomatoes, sugar, honey, dairy, fish, animal feed, among others. Most of them have their selling points in some urban parts of Karongi District. In addition to crops, livestock is another important source of income and food for agricultural households. Regarding the livestock populationof the District of Karongi, cattle (198,613) comes first, followed by goats (181,637), chicken (108,026), rabbits (19,427), sheep (17,902) and pigs (6,357)7, as shown in the tablebelow. Since there is a large cattle population available in the district, the expansion of milk production can be recommended. The Girinka Program (One Cow per Family) has increased the number of cows producing milk in Rwanda and especially in Karongi.There are 18 Milk Collection Centers located in nine sectors of Karongi District. However,only 12 are operational so far.

Mining in Karongi represents 0.1% of employment, whereas the national average is estimated at 1.0%. Karongi District has important deposits of Wolfram, Coltan and Cassiterite, big quarries consist of granites in Karongi Sectors. However, research is required to determine how best to engage in mining in the district and to develop appropriate techniques and capacities. From April 2011 to April 2012, the total mining production in Karongi District was 6,335 kg amounting to 0.07% of the total national production which is estimated at 9,148,980 kg of minerals.

b. *Road network*

Karongi District consists of a rural area with a poorly developed road network. Inadequate roads raise transport costs, which limits the access to markets to sell and purchase goods, limitspossibilities of off-farm jobs and makes it difficult to access educational and health facilities.

The basic infrastructure in the rural areas has to be improved to facilitate the co-relationbetween the rural sectors and the urban centers, especially with regards to trade and transfer of agricultural products.

c. *Access to healthcare*

95.5% of the population is covered by health insurance mechanisms 12, which is a high performance as compared to the national figure of 90.7% and the national target of 100% coverage. There are 20 health centers, two health posts, one prison dispensary and one district hospital in Karongi District. They all have access to water, internet and electricity. A previous assessment highlighted that some health centers will need extension or recruitment of health staff. It is also realistic to add that there are other private clinics that operate in some emerging cities which provide support to the public. Here, privateinvestors have to start investing in health facilities provision. With regards to the distance covered in order to reach health facilities, EICV3 indicated that the mean walking distance to a health center in Karongi District is the same as the national level (60 minutes) and 48.3% of households walk for under one hour to reach a health center.

d. *Energy sources*

The connection to electricity power counts for 11% of the district's households (10.8% countrywide) as the report produced by EWSA in June 2012 indicates. In 2011, the population which is located less than 20 minutes from all-weather road is estimated at 56%.

Official Use Only

e. *Education and literacy*

The literacy rate is 67.5% in the district. This constitutes a challenge to the creation of off- farm employment and service-based activities like tourism. Adults' training programs shallbe needed to bridge this gap.

The classroom/school ratio in Karongi District is 14/1 in primary schools and 9/1 in secondary schools. At national level these figures are respectively 11/1 and 9/1. The pupil/teacher ratio in Karongi District is 61/1 in primary schools and 30/1 in secondary school. At national level these figures are respectively 63/1 and 29/1.

With regards to the availability of tertiary education, of 31 registered higher learning institutions whose branches are distributed throughout 17 Districts of Rwanda, there is none in Karongi District.

In Karongi District, 43.8% of households have less than 30 minutes of walking distance to a primary school. This rate is below the national average of 54.7% of households. 21.1% of Karongi District's households need to walk more than one hour to reach primary school, compared to the national average of 10.8%.

f. *Access to clean water*

On average, only 23% of households in Karongi District are within 15 minutes of walking distance of an improved water source. Karongi District ranks sixteenth among all districts by percentage of households within 15 minutes of walking distance to an improved water source. It is, however, important to note that 11.9% of households in Karongi walk more than 30minutes to an improved source of water. The average time to an improved water source in Karongi District is 13.5 minutes, which is slightly better than the national average (14.4 minutes). With regard to sanitation, Karongi has the highest percentage of households countrywide withaccess to improved sanitation facilities (92.8%). This figure is above the national average (74.4%), but only 42.3% have access to improved water sources. The EDPRS I target on sanitation was 65% of the total population with hygienic sanitation by 2012. EICV3 revealed that the majority of households use surface water (rivers or lakes) with 41%, followed by other improved sources (19%) and then public standpipes (18%). At the time of EICV3 resultspublication, Karongi District was a long way from achieving the EDPRS national target for the water sector, which was to increase the access to drinking water to 85% by 2012.

g. *Gender Analysis*

For the purpose of achieving poverty reduction and economic growth in a sustainable and equitable manner, key cross-cutting issues have been incorporated into the strategies to support district economic development, including gender mainstreaming, environmentalprotection, the rights of people with disabilities, etc.

Official Use Only

Chapter V: Presentation and Comparison of Considered Alternatives

The identification, consideration and analysis of alternatives is an essential component of the impact assessment process, with the primary objective being to determine the best environmental and social option. This section elaborates on the alternatives that have been identified, analyses each, eliminates non-viable alternatives and determines those that can be carried forward into the comparative impact assessment.

5.1. Identification of Alternatives

The identification of project alternatives includes the consideration of the proponent's 'preferred option', as detailed in the preliminary route design drawings. The proposed line routes and ROWs were selected among the various options, based on the softness to satisfy the set criteria. Environmental soundness was equally considered with any other technical or financial considerations when selecting the line routings and ROWs. In selecting the proposed route, the over-riding considerations were:

a) Route/Transmission line alignment and tower designs /or location of project activities.
b) Designs of electrical infrastructure and what technology is proposed.
c) Use of alternative technology; and
d) Various implementation methods and techniques.
e) The avoidance of environmentally sensitive areas and avoiding passing over houses which shall incur house demolition and hence physical displacement,
f) The minimization of the destruction of property,
g) Low pollution level by avoiding water sources and marshland's locations

The above aspects are considered, and the alternatives identified for the project are listed and described in Table 12 below:

Table 12: Description of Identified Alternatives

No	Name of Alternative	Description
1	Preferred Option: Overhead Power Lines	This alternative is as proposed by REG, detailed in the preliminary route designs received for the project, involving overhead power lines. This option considered the alignment of the transmission line which was routed to reduce the number of affected houses and environmental damage. This alternative is described in more detail in Chapter III of this report.
2	No-Go Option	This alternative means that no distribution lines are constructed, and the situation remains as is.
3	Underground Power Lines	This alternative involves the construction and laying down of distribution lines in the ground.
4	Alternative Energy Generation: Solar	This alternative involves the generation of electricity closer to thesource of where it is needed, requiring connection to a mini- or localized electricity distribution grid, depending on the scale and reach of the solar facility.

5	Construction Methods	This alternative involves the implementation of alternative construction methods, as compared to those proposed in Alternative 1 or the preferred option.

5.2. Analysis of Alternatives

The alternatives that have been identified are analyzed to determine which are viablealternatives to consider for the project. The analysis of alternatives is detailed in Table 13 below:

Table 13: Analysis of Alternatives

No	Name of Alternative	Analysis
1	Preferred Option: Overhead Power Lines	REG has proposed the construction of overhead power lines as the preferred option. This option remains cost effective and is a well-established method of distributing electricity in rural areas inRwanda and East Africa. The compensation will take place within 30 m of Right of Way, and only Trees with height measuring more than 5 m will be felled. This option considered the alignment of the transmission line which was routed to reduce the number of affected houses and environmental damage. This option is considered viable and is assessed.
2	No-Go Option	The No-Go option goes against the national development objectives of Rwanda, as related to the increase of access to electricity for citizens. This option is however assessed further in the impact assessment, as it provides a valuable reference against which other viable options can be compared.
3	Underground Power Lines	In some urban areas, distribution and service lines are typically placed underground for safety and aesthetic reasons, particularly at lower voltages. Underground construction is not considered a practical option for this 220 kV transmission line. In addition, the proposed project length is approximately 56.5 km, making underground installation substantially more complex and costly than the preferred overhead option.
4	Alternative Energy Generation: Solar	The use of solar energy is a consideration, since the Project Area has good solar radiation. Solar energy, whether grid-tied or standalone, cannot however service high energy demands, such as for small industries like metal workshops, for instance. Other small and medium business enterprises that could make use of solar energy, would require sizeable systems, which require significant and upfront capital investment; a typical limitation in the establishment of such facilities. Typically, solar energy systems can be used for domestic applications, as well as installed in a hybrid application and tie into the national or local grid. In the case of the national grid, the necessary baseload required to ensure reliable and uninterrupted power supply, is in place through the national energy mix. Small and medium-size businesses that can afford to install grid-tie systems, would do so more readily if the surplus electricity produced could be

No	Name of Alternative	Analysis
		sold back into the grid or allow for the accumulation of electricity credits. In the instance of this project, solar energy generation is not seen to be a viable option, as it will not be able to provide more cost effective and reliable electricity to trading centers in rural areas. This option is thus eliminated from the assessment. Such systems may in the future become more economically viable.
5	Construction Methods and Techniques	The construction methods and techniques proposed in Alternative 1 involve largely hand work and have insignificant direct impacts. The consideration of this separate option is thus unnecessary, as it already falls into the preferred option described above. This alternative is thus eliminated.

Therefore, based on the proposed project nature, extent and location and based on the social and environmental assessment of the project site, the consultant is concluding that the most preferred alternative would be implementing the project with the implementation of mitigation measures of the anticipated negative issues as detailed in this report.

The project has identified more positive than negative environmental and social impacts. The identified potential impacts to both social and environment have been found to be at an extent that can be avoided, minimized, or compensated when applying the proposed mitigation measures in the Environmental Management Plan and monitoring plan as developed in this report.

Chapter VI: Potential Environmental and Social Impacts

6.1. Introduction

The objective of the assessment of impacts is to identify and assess all the significant impacts that may arise from the undertaking of an activity and findings used to inform the competent authority's decision as to whether the activity should be either authorized, authorized subject to conditions that will mitigate the impacts to within acceptable levels or refused.

In this sense, impacts are defined as the changes in an environmental parameter that result from undertaking an activity. These changes are the difference between effects on an environmental parameter where the activity is undertaken compared to that where the activity is not undertaken and occurs over a specific period and within a defined area.

6.2. Impact Types

Different types of impacts may occur from the implementation of this type of project, which maybe positive or negative, and can be categorized as being either direct (primary), indirect (secondary) or cumulative.

Direct impacts are impacts that are caused directly by the activity and generally occur at the same time and at the place of the activity (for example, dust generation from excavation activities). These impacts are usually associated with the construction, operation or maintenance of an activity and are generally obvious and quantifiable.

Indirect impacts are induced changes that may occur as a result of the activity (for example the use of water from a natural source at the activity will reduce the capacity for supply to otherusers). These types of impacts include all the potential impacts that either do not manifest immediately when the activity is undertaken, or which occur at a different place because of the activity (Jain et al, 1993; Fuggle and Rabie, 1994).

Cumulative impacts are impacts that result from the incremental impact of the proposed activity on a common resource when added to the impacts of other past, present or reasonably foreseeable future activities (for example, removal of vegetation may cause soil erosion, leadingto excessive sediments in receiving stream, leading to reduced sunlight penetrating the water andthus reducing dissolved oxygen in the water and adversely affecting aquatic life and waterquality).

Cumulative impacts can occur from the collective impacts of individual minor actions over aperiod of time and can include both direct and indirect impacts (Jain et al, 1993).

In the context of the Bwishyura–Kigoma Transmission Line Project, no significant cumulative impacts are anticipated. The project mainly involves the installation of transmission towers, stringing of conductors, and construction of small access routes within an already developed and modified landscape. The proposed line will run parallel or close to existing infrastructure corridors such as access roads and local distribution lines in some areas, which minimizes the likelihood of significant cumulative environmental or social effects. Potential minor cumulative impacts could arise from temporary disturbance due to concurrent infrastructure works in the region (e.g., rural electrification or road maintenance), leading to short-term increases in dust, noise, and traffic. These will be managed through coordination with local authorities and adherence to the Environmental and Social Management Plan (ESMP).

Regarding **associated facilities**, none are planned beyond the standard components integral to the transmission line project. The proposed Bwishyura–Kigoma line will connect to existing substations at Bwishyura and Kigoma, which are already operational and not being constructed specifically for this

Official Use Only

project. Therefore, no new substations, access roads, or ancillary structures are considered “associated facilities” under the ESIA scope.

6.3. Identification of Potential Impacts

In order to identify the potential impacts of this project, we used the matrix of identification which is an adaptation of the matrix of Leopold et al. (1971).
The matrix was designed for the assessment of impacts associated with almost any type of development project. Its main strength is a checklist that incorporates qualitative information on cause-and-effect relationships. The Leopold system is an open-cell matrix containing project actions (sources of impacts) along the vertical axis and environmental 'characteristics' and 'conditions' along the horizontal axis.

6.4. Methodological approach

6.4.1. Desk Review

To ensure this level of compliance and to recognize internationally accepted best management practices, the desk review focused on the following:

- Overall biophysical environmental impact and constraints (with reference to soils and underlying geology, impact on flora and fauna populations);
- Overall impact on the surrounding environment due to surface structures, and associatedinfrastructure.
- Water and wastewater management.
- Hydrology and hydrogeology.
- Process emission (both gaseous and effluent) and air quality from the operations andpotential effects, including dust.
- Method of waste disposal (solids, slurries, liquids) to minimize environmental impact; and
- Site rehabilitation.

6.4.2. Data Collection methodology

In the framework of the environmental impact assessment, consultations were initiated in each district administration, and communities affected by the project. That approach was meant to collect complementary information, to gather comments and to know the concerns raised by the project with regard to the biophysical environment.
The data collection was done using tablets in order to manage the short time we had, and control data collected every day. The 2 days of training sessions also gave the survey team an opportunity to assess the quality of questionnaires and covered the following activities:

(i) Familiarize all surveyors with all questions in questionnaire, including their purpose, range of potential answers, how to prompt if needed, sensitiveness of the questions if any, and so on;
(ii) Accustom all surveyors with the use of tablets and survey CTO software along with data collection;
(iii) Test the surveyors for their learning ability, knowledge, interviewing skills, and so on;
(iv) Decide how to resolve confusing issues related to interviewing, when and how to prompt.

A trainer was at the same time in charge of electronic data management, processing and analysis. The training exercise consisted of reviewing all questions in the questionnaire one by one, explaining

Official Use Only

the intent of them, their possible responses and how the questions should be asked. Surveyors were trained through interactive presentation exercises, group assignments, mock interviews and role play, and at the end, given tests to demonstrate their level of understanding of the questionnaire.

This exercise was double fold as surveyors were at the same time being trained to understandthe questionnaire but also to be able to apply data collection using electronic devices-tablets for the survey CTO collects software application.

To abide with time constraints, four teams were deployed concurrently on four sites while one team remained in the office in Kigali for data entry and report narrative activities. Each team had the following members:

- One experienced EIA expert as team coordinator.
- One experienced topographic surveyor
- Another environmentalist to oversee all site environmental issues
- One enumerator
- Consultations were carried out at two levels:
- At the central level, that consultation involved resource persons with an expertise in one orthe other area tackled by the study (land, forestry, environment, quarries, and mines,water resource management, etc.);
- At the decentralized level, local administrative authorities were consulted from the provincial level, districts up to the sectors, particularly those from regions that will be affected by the power line project.

The interview method was used during consultation with experts from different institutions at the central level, as well as with local authorities from provinces, districts and sectors. An introductoryletter to the different authorities was thus prepared by IBC Group and was given to the team of consultants working on the environment component. That letter requested the authorities to facilitate the work and to provide the information needed by the visiting consultants. Before consultation, an appointment was first of all requested with each given authority or expert, and during the interview, we would present the copy of the introductory letter as well as an informationleaflet that would give a brief introduction of the power transmission lines project (List of the interviewed persons in Appendix 1).

The purpose for that public consultation is summarized through the following:

- To gather new environmental information in the study area.
- To inform authorities and experts about the project and particularly those from institutions with an interest in the project due to their areas of competence or responsibility.
- To know the concerns on environmental components that will be affected and proposal forpotential mitigation measures.
- To discuss synergies and possibilities of integration of the project into other projects underway or being planned, or to identify possible duplication with the latter.
- To identify ways of cooperation with the various institutions at different phases of theproject implementation.

6.4.3. Impact and risk Assessment Methodology

The methodology used for impact assessments in this report will relate to risk assessment (whereby certain impacts to the environment are identified), risk evaluation(by using a stipulated assessment criteria whereby impacts are given a rating or weighting and obtaining an overall rating or significance

Official Use Only

of an impact) and risk management (relating directly to applicable mitigation measures to be implemented to manage a risk of an impact in the best interest of a society; Schogren, 1990). The guideline criteria followed in this study are presented in the table below.

Table 14: Assessing criteria and ratings used for determining impact significance

Nature or Status of the Impact: The type of effect the activity would have on the environment		
Status		**Description**
Positive:		A benefit to the holistic environment
Negative:		A cost to the holistic environment
Neutral:		No cost or benefit
Duration of the Impact: The lifetime of the impact		
Score	**Duration**	**Description**
1	Short term	Less than 2 years
2	Short to medium term	2 – 5 years
3	Medium term	6 – 25 years
4	Long term	26 – 45 years
5	Permanent	46 years or more
Extent or Scale of the Impact: The distance from source that impacts may be experienced		
Score	**Extent**	**Description**
1	Site specific	Within the site boundary
2	Local	Affects immediate surrounding areas
3	Regional	Extends substantially beyond the site boundary
4	National	Affects country
Reversibility of the Impact: To what degree its influence on the relevant environment can be negated.		
Score	**Reversibility**	**Description**
1	Completely reversible	Reverses with minimal rehabilitation & negligible residual affects
3	Reversible	Requires mitigation and rehabilitation to ensure reversibility
5	Irreversible	Cannot be rehabilitated completely/rehabilitation not viable
Intensity or Magnitude of the Impact: Severity of the negative and magnitude of positive impacts		
Score	**Severe/beneficial effect**	**Description**
1	Low	Little effect - negligible disturbance/benefit
2	Low to moderate	Effects observable - environmental impacts reversible with time
3	Moderate	Effects observable - impacts reversible with rehabilitation
4	Moderate to high	Extensive effects - irreversible alteration to the environment
5	High	Extensive permanent effects with irreversible alteration
The Probability of the Impact: Describes the likelihood of the impact actually occurring		
Score	**Rating**	**Description**
1	Unlikely	Less than 15% sure of an impact occurring
2	Possible	Between 15% and 40% sure of an impact occurring
3	Probable	Between 40% and 60% sure that the impact will occur
4	Highly Probable	Between 60% and 85% sure that the impact will occur

5	Definite	Over 85% sure that the impact will occur
The Consequence (C)		= Magnitude/Intensity (M/I) + Extent (E) + Duration (D) + Reversibility (R).
The Significance (S)		= Consequence (C) x Probability (P)

6.4.4. Determination of Significance

After assessment of an impact in accordance with the criteria described above, the significance of an impact can be determined. The various ratings as indicated above are accorded to these criteria. These ratings are then used to calculate a significance (S) rating and are formulated by adding the sum of ratings given to the extent (E), duration (D), Reversibility (R) and Magnitude (M)/intensity (I) and then multiplying the sum with the probability (P) of an impact as follows:

Significance (S) = (E+D+R+M/I) X

The significance rating is described as follows:

Table 15: Significance rating table

Score out of 100	Significance
1 to 20	Low
21 to 39	Low to Moderate
40 to 60	Moderate
61 to 79	Moderate to high
80 to 100	High

Application of the method. The scores in Table 14 and the bands in Table 15 have been applied to every impact listed in the summary tables of this report, namely Table 18 (impacts on the natural and social environment) and Table 20 (project impact rating). Both tables show the component scores (M, E, D, R and P), the consequence C and the significance S next to the rating, so that the reader can follow how each rating was reached.

Conversion of descriptors. The descriptors used in the summary tables were converted to scores as follows. Duration: temporary impacts score 1 where they last only a few weeks at one location and 2 where they last for the construction period (two to five years); permanent impacts score 5. Extent: specific = 1, local = 2, and common (along the corridor and beyond the immediate site) = 3. Intensity: low = 1 or 2, average = 3, high = 4 or 5. Reversibility and probability are scored from Table 14 for each impact.

Rating classes. Table 22 uses four classes, which correspond to the bands of Table 15 as follows: Negligible = 1 to 20 (Low); Minor = 21 to 39 (Low to Moderate); Moderate = 40 to 60 (Moderate); Major = 61 to 100 (Moderate to High and High).

6.5. Source of impacts

6.5.1. Manpower

Construction works for high voltage lines will require several teams of works according to their expertise:

- After clearing the right-of-way of lines, a team of surveyors sets the location of the four legs of each tower;
- A team of civil engineers follows to carry out excavations of tower bases and install,

Official Use Only

regulate and pour concrete for bases (generally four feet) of towers;

- A team for establishing the tower structure erects the towers, generally 1to 5 towers a day;
- A team of wire and cable pullers continues the work of cable installation;
- Cleanup and rehabilitation of work sites.

Although the majority of work is done manually (tree cutting, excavation, equipment transportation, etc.), machinery on site may be used. Those are overhead shovels, trucks and power jib cranes. All works will be limited to the nominal right-of-way and access tracks and carried out during daytime.

6.5.2. Works

During the pre-construction and construction phases, sources of impact on environment and their consequences include among others:

- Construction of roads to access work sites: encroachment in wetlands, fragmentation of wildlife habitats;
- Clearing of the line's right-of-way with width of 30 m and access roads including tree cutting and waste management: loss of vegetation;
- Management of site installations including construction of material storage and storage personnel office: water and soilpollution from inadequate installations of wastewater and solid, liquid and hazardous materials management, etc.;
- Arrival and presence of workers in rural areas: overuse of local resources such as water, fuel wood and other natural resources such as fauna (poaching);
- Transportation and traffic related to movements of manpower, machinery and construction materials: noise, dust, security;
- Excavation works and other earthmoving and tower construction activities:
- soil erosion, encroachment in wetlands;
- Waste and contaminants (engine oil, fuel) disposal: soil and water pollution.

The main sources of negative impacts during the operational phase are:

- Maintenance (clearing) of the right-of-way: permanent control of vegetation using mechanical or chemical methods;
- Presence of line as an obstacle to movement of birds: mortality through collision;
- Presence in the landscape of line itself: landscape degradation.

It should be noted that the layout retained has already been optimized during the prefeasibility and feasibility phases in such a way as to avoid the main sensitive environmental components: protected areas, swamps, forests, etc.

6.6. Nature of impacts

The project will generate impacts during the construction phase as well as during theoperational one. It will require construction works that will extend over at least three years. Indeed, the new 220 kV double-circuit transmission line will connect to the existing Kigoma substation and covers a total distance of 56.5 km in a total corridor of 169.5 hectares. Moreover, the maintenance of the ROW and the line requires periodic access to the facilities to ensure their maintenance during the project lifespan.

6.6.1. Permanent impacts

Those impacts are related to the operational and maintenance phases of the transmission lines and substations. Maintenance and repair of equipment include all activities required to ensure at all times

Official Use Only

the good operation of lines and substations. Maintenance consists especially in preventive measures for verification and repair of equipment. Teams especially trained for that task will move under conductors on the ground, at various intervals, in order to make observations on conductors, insulators, towers, etc. Inspections will also take place in substations for transformers and other equipment. The ground patrol is done from the existing road network with four-wheel drive vehicles, whatever the season. Repair consists of rehabilitation of defective equipment. According to the nature of the break or fault, light or heavy machinery will have to move in the ROW of lines or substations.
Maintenance of the ROW also requires regular clearing of vegetation in order to reduce short-circuit risks caused by electric arcing.
The main permanent environmental impacts are:

- Soil erosion;
- Permanent loss of vegetation (trees and shrubs) in the ROW of lines and substations;
- Destruction of terrestrial wildlife habitats;
- Risks for birds' collision with the wires and structures;

Impacts on particularly attractive landscapes are also considered in the environmental impact assessment because they will persist during the project lifetime.

6.6.2. Temporary impacts

Temporary impacts are those related to the construction phase (of transmission lines and substations). They mainly consist in:

- Dust and noise emission;
- Soil erosion;
- Degradation of water quality;
- Soil contamination by bad waste management or accidental spilling of hydrocarbons.
- Displacement of wildlife.

6.6.3. Power line

The progress of the construction phase will be as follows:

- Siting and topographic survey of the line;
- Tree removal and clearing of the ROW over a width of 30 m;
- Preparation of access roads and their maintenance;
- Soil testing;
- Complete construction of foundations, including grounding and measuring of towers' earth resistance;
- Erection of towers;
- Installation of cables including stringing and drawing in of cables;
- Site clean-up;
- Different tests and acceptance.

6.6.4. Access roads

In order for the site to move from tower to tower, an access road will be created by the contractor, only where there is no access. Works will consist in creating longitudinal access roads to the various towers of the line and transverse access roads that will make it easy to join quickly the different points of the line from main roads. Longitudinal tracks will be established in the ROW ofthe line. Those tracks will be appropriately leveled and will include a sufficient lateral clearing of vegetation.

General features of the access roads will be:

Official Use Only

- Width of the track: ±5 m;
- Accessible by a four-wheel drive vehicle even during the rainy season;
- Equipped with smaller works for crossing seasonal watercourses (inverts, gabions, culverts).

The contractor will maintain in ridable state the access tracks required to reach the towers. Theyshould be ready on the day of work completion.

Passage from one tower to another will preferably be done in a straight line, in the ROW, along the line or in coming back by a curb ramp to tracks and existing works.

The layout will be established in advance, during a visit that will include the site environmental risk management officer (SESO). Some minor modifications could be made later on the basis of experience acquired during works, but they will have to be approved by the SESO.

6.7. Impact Description

Impacts on the natural environment related to the different phases of the project may be described in the following table.

6.7.1. Potential Impacts during construction phase

Table 16 Summary of impacts on the natural environment

Activities	**Physical Environment**			**Biological Environment**		**Landscape**
	Soil	Air	Water	Flora	Fauna and	Landscape
Preparation Phase						
Picketing of ROW			X	X	x	
Clearing of ROW			X	X	x	
Construction Phase						
Preparation of access	X	x	X	X	x	x
Construction of towers and substations	X	x	X	X		x
Transport of equipment		x			x	
Erection of towers and installation of cables					x	x
Site cleanup activities		x	X	X	x	
Operation Phase						
Maintenance of ROW				X	x	x
Operation & Maintenance of equipment				X		x
presence of the line	X	X		X	X	x

Official Use Only

a) Soils

The impacts of construction of transmission lines and substations on the soils are particularly associated with activities for site preparation, excavation for preparation of access roads, tower erection and transport of equipment as well as installation of conductors.

Tower erection will require foundations covering about 2.5 m by 2.5 m (6.25 m²) with a depth of 2.5 m, depending on the soil's conditions. Thus, affected areas are relatively reduced. Excavation works will leave those areas vegetation-free, submitting the soil of steep sectors to erosion. In addition, excavated materials will be generated and may be transported by erosion and be found in various water courses. Those materials could be reused for the development of access tracks when possible.

Soils exposed on steep slopes are particularly sensitive to erosion while hydrosoils are subject to formation of ruts. During the rainy season, impacts on soils will therefore be significantly more important than in the dry season. Thus, if the soil is wet, works could suffer delays. Those delayswill have to be dealt with by using more important means (materials, personnel), which will increase the cost for works.



Figure 9: soils in the project area

Official Use Only

Oil and fuel used by equipment during the transmission line construction may also contaminatesoil and affect biodiversity, crops and human health.
In order to avoid too many negative impacts on the soils by the works, areas with difficult topography should be spared during the establishment of access roads, as well as wetlands where soils are highly saturated.

b) Construction of access tracks

In order to have access to the power line, a track will have to be constructed at several places.During the drafting of this report, the location of access points was not defined because it will be the duty of the Contractor in charge of construction works.
Changes made to the topographic profile during the construction of tracks or for the substations' earthworks are permanent. However, remodeled surfaces will be reduced: ±5 m of width for thetrack and only the area of substations.
The nature of the soil along the ROW being not uniform and topography being very different, a change in the soil structure is to be projected. In most cases, the spoils will serve to fill in the small lows, but the provision of exogenous materials is required for the tracks to be more stableand sustainable, the latter having to serve later as access tracks for maintenance teams.
Just as mentioned previously, if works are undertaken in dry season, impacts will be reduced. In wet season, rains will cause instability and erodibility of the soil's superficial layers as well as a significant increase of water levels, and the tracks will require a thicker layer of spoils. In that case, the surface of the terrain will be modified by the presence of a berm where the track will be established. In this case, works will also require much more resources (materials, personnel), which will increase the cost associated with the cost in addition to higher impacts.
The soils in the different areas concerned by this study where the transmission lines pass by are in 2 major pedologic groups, respectively, one part of ferralsols and xero ferralsols. Overall, soils are generally deep in some places, with a clay horizon and sensitive to erosion. However, in general, soft silt soils and those in areas with steep slopes represent soils that are likely to be more sensitive to erosion.
Furthermore, risks of rockslide are probable in areas with fragile soils with schizo-quartzic materials and in areas where abrupt summits, mostly ferrisols, are subject to intense erosion.
There are areas that are particularly prone to erosion in the 2 concerned districts.

c) Air and noise

Risks of air contamination are associated with dust and gas emissions. People at risk are thoseliving in settlements along the roads used by heavy vehicles during construction and near worksites. The issue of noise and air contamination is also linked to tree removal activities andconstruction of access roads to the ROW, because works will normally be undertaken during the dry season.
Combustion of fuel from vehicles used for transport of building materials is a source of air contamination, the same as for burning grass and trees from vegetation cutting to clear the line.
In some cases, work will be carried out near residences and businesses along the ROW or near the substations. Noise will result from the use of machinery and traffic during construction. Except for urbanized areas, where the normal level of noise is higher, construction will thereforecause for a certain period of time an increase in the ambient noise level.
Noise associated with construction can disturb households and neighboring communities of theROW as well as the local wildlife. That temporary impact can be minimized by the use of various mitigation measures described under Chapter VII.

Official Use Only

d) Water

The main watercourses of the study area are mainly Lake Kivu, Ururumanza, Rugando, Uruniga, Agaseso, Akamira in Ruhango District and many other streams. There, HV lines also will cross several marshlands. The construction and maintenance of transmission lines may also have both short and long-term effects on water resources. The quality of water may be indirectly affected by soil erosion and sedimentation caused by vehicles' wading crossing, construction of temporary or permanent bridges for access roads, or during clearing of the ROW. Works undertaken will not have to cause any significant modification of watercourse flowing during the establishment of bridges, inverts, pipe arches, or culverts.

Drainage modifications due to the preparation of tower foundations, stream siltation following soil erosion and pollution caused by oil and fuel spilling, as well as encroachment in wetlands can as well cause significant impacts on water resources.

Final determination of the towers' base during construction will have to avoid watercourses and wetlands,which will limit the impact on the water and wetland environment.



Ururumanza	Rugando	Agaseso

Figure 10: Spotted streams in the corridor

During the wet season, heavy rains may be responsible for soil surface erosion. Thus, accumulated materials for construction are likely to happen, if their grainsare fine, to be washed away and carried to watercourses, increasing therefore the muddiness of water already high in this season. Devices for retention and sedimentation of suspended particles (deflectors, pits) will have to be installed.

The piezometric level being sometimes at the ground level, chemical components resulting from the concrete of tower foundations may be found in drinking water pumped from boreholes. Other contaminants resulting from site activities (lubricants, waste oils, solvents, etc.) may be spilled accidentally and found in the water system or ground water. In order to protect ground water, no tower should be located in a radius of less than 50 m around a borehole used for drinking water supply.

Whether in the dry season or wet season, contractors working on behalf of the project promotermust ensure that no discharge from the machinery (crankcase oil) or from the work area (organic pollution) should be observed in the environment.

The transmission line as such will have little permanent impact on hydrography or water resources. Drainage modifications will however be long-term because the access roads andfoundations of towers could cause modification to the flow pattern for surface water.

In contrast, access roads may introduce long-term damages on a large area. If the construction works

Official Use Only

are undertaken during the rainy season, their establishment will cause formation of puddles and water areas and even divert the natural flow of some watercourses, because of the importance of soil movement (cut and fill). That is why, duringthe realization of works, as previously indicated, the road track will be constructed with all structures required for water drainage.
The different substations have transformers that contain several tons of insulating oil. In order to avoid any contamination, there is provision to place a watertight pool under each one of them with sufficient capacity to contain its entire amount of oil. No oil containing polychlorinated biphenyl (PCB) will be used.

Generally, whatever the equipment maintained, modified or repaired, technical teams will ensure that no leakage of contaminating or hazardous materials occurs. In case of accident,those materials will be recovered and stored in waterproof tanks for their processing.

When they are mitigated through implementation of mitigation measures, impacts associated with pollution and siltation are short-term; otherwise, they may be long-term and irreversible.
During construction, spoils will be produced during excavations of tower foundations. Those materials left in scattered piles could cause siltation of streams, which would lead to pollution. Spoils should be promptly collected and disposed of at designated, stabilized disposal sites away from water bodies, with appropriate erosion and sediment control measures in place. In addition, affected wetlands, especially those that will have several towers, will be prone to sedimentation. Those deposits will indeed change the water's normal flow in wetlands and flooding plains leading to siltation and flooding.

e) Flora

Construction of a transmission line through wetlands, forests, coffee and banana plantations found along the proposed ROW requires trees and brush to be cleared from the ROW. That clearing may have an impact on the number, health and survival of species within the right of way. Fragmentation makes the species within the forest more vulnerable to predators and parasites, and increases competition by species coming from the edge side. Damages to vegetation lead to destruction of habitat. The regular maintenance within the ROWof transmission lines will require clearing of vegetation in the ROW as well as along access roads. That means that no vegetation of more than 4 to 5 m of height will be tolerated within the ROW.
In a general sense, natural environments concerned by the project are degraded and ecologically poor because of expansion of human activity. The suppression of the woody component of the vegetation and the regular maintenance mowing will finally cause a localized change into savanna for the vegetation. The grassland thus created will increase risks of bushfires that are already very common in the region.
The ROW ofthe transmission line will undoubtedly become a penetration track for peasants in areas so far uncleared because of access problems. Those new access tracks should indirectly lead to an increase of cleared acreage for cultivation.

Forests with eucalyptus trees and other agroforestry species exist almost everywhere in the ROW. They will be partially destroyed in order to clear the ROW and access roads.

Flora that will be affected by the construction of the transmission lines are mainly the vegetation in the project area. In case of groups of trees, the clearing of the ROW is likely to break them into small, wooded areas. Fragmentation of forest habitats makes flora and fauna species more vulnerable to parasites and competition by species from outside.

Official Use Only

Trees that are directly in the ROW are estimated at 28 ha with the majority of them eucalyptuses (90.3%). Those trees continue to be a source of timber and firewood for both rural and urbanpopulations. The clearing of the ROW and the construction of access tracks will lead to tree cutting and therefore to the increase of deficit in domestic energy resources of the population inthe study area, among whom more than 90% use wood for lighting fires.

f) Wildlife

Impacts on wildlife mainly include destruction of habitats, poaching and frightening by construction noise. The natural environment analysis shows relative wildlife poverty because of human presence, hunting, bushfires and degradation of biotopes.

Indeed, given the extent of sections inhabited at many places along the lines and human activities associated, wild mammals and birds have almost disappeared from the proposed corridors in some segments mainly associated with watercourses and wetlands (swamplands: birds). Birds will be affected by the noise generated by construction works such as transport, clearing, etc. It is most probable that birds and other animals from swamplands will migrate to other zones where they will then be threatened by poaching. However, that impact will only be temporary and will stop once construction works are completed.



Grey-headed sparrow



speckled mousebird

Figure 11: Bird species observed in project sites

The impact on the fauna of open forests is small considering the low significance of the ROW with regard to the limited changes that the lines impose on the existing environment, already made of very open spaces.

g) Landscape

Relief features and vegetation offer beautiful and very attractive landscapes in several sectionsof the project. Spectacular views of the landscape are a good potential for tourism attraction.

Construction of 220 kV transmission lines and substations can be considered as an element of incoherence in a natural landscape, because it changes the visual field of agroforestry landscapes all along the corridor. By their nature and due to spatial entities that they link, HV transmission lines hardly have a logical link with the landscape they cross. Moreover, they can hardly be hidden. Whether they are coupled or not with other infrastructure, that incompatibility remains significant.

The construction of transmission lines also requires delimitation of a corridor to establish towersand

Official Use Only

conductors. In wooded areas, where minimal distance for vertical clearance must be maintained between conductors and vegetation, it is necessary to cut and remove trees. Impacts on the visual environment also depend on the observer's perspective.

From roads, towns and villages or tourist sites, the corridor and the transmission line mayhave a significant negative impact on the landscape.

In order to reduce the visual impact of the line, landscape mitigation measures will have to be implemented. Among them, the following can be mentioned:

- ✓ Selection of a type of pylon adapted to the environment: less high, single-legged, etc.
- ✓ Camouflage of pylons by coloration in harmony with surrounding environment; planting trees or hedges in order to block view in the ROW and camouflage particularly exposed and/or visible pylons.

To mitigate the impact, the transmission corridor and the associated structures should be keptlow, not higher than the hills, to minimize the visual impact of the transmission line.

h) Social Impacts

In addition to environmental impacts, the construction of the transmission line is likely to result in several adverse social impacts. Increased traffic from construction vehicles may pose road safety risks, especially in populated or school zones. Furthermore, the congregation of workers and increased mobility may facilitate the spread of communicable diseases, including sexually transmitted infections and respiratory illnesses. These risks call for comprehensive mitigation measures such as strict Codes of Conduct, community awareness, traffic management plans, and health and safety protocols.

6.7.2. Potential Impacts during operational phase

a) Potential Impacts due to Electromagnetic fields

High-voltage transmission lines generate electric and magnetic fields (EMF) as a result of voltage and current flow. These fields are forms of non-ionizing radiation and are commonly present in both natural and man-made environments. Naturally occurring electric and magnetic fields include the Earth's geomagnetic field, while common household appliances such as televisions, refrigerators, electric razors, and power tools also produce EMF, often at higher levels at close proximity than those generated by transmission lines.

Baseline electromagnetic field conditions in the project area are limited to natural and background sources. The Earth's geomagnetic field typically ranges between 25 and 65 μT, depending on geographic location, and represents the dominant natural magnetic field in the environment. In rural areas such as the project corridor, additional electromagnetic fields generated by existing electrical infrastructure are generally very low, typically below 0.1–0.2 μT, and are mainly associated with household electrical wiring or nearby low-voltage distribution lines. Consequently, prior to the construction of the proposed transmission line, EMF levels within the project area are considered to be very low and consistent with normal background environmental conditions.

Based on international reference data for a 220 kV transmission line, the electric field directly beneath the conductors is typically in the range of approximately 2–3 kV/m and decreases rapidly with distance (to about 0.25 kV/m at 25 meters and below 0.05 kV/m at 100 meters from the centerline). The associated magnetic field directly beneath the line is generally below 15 microtesla (μT) and similarly declines sharply with increasing distance from the ROW. For comparison, certain household appliances such as electric razors can generate magnetic field levels exceeding 100 μT at very close distances (a few centimeters).

The International Commission on Non-Ionizing Radiation Protection (ICNIRP) guideline reference

Official Use Only

levels for public exposure to power-frequency (50 Hz) EMF are:

- Electric field: 5 kV/m
- Magnetic field: 200 μT

Predicted EMF levels from the proposed transmission line remain well below these international exposure limits at the edge of the Right-of-Way. Because EMF levels are determined primarily by voltage, current, and distance—and can be reliably modeled—dedicated baseline field measurements are not considered necessary. However, if community concerns arise during operation, spot measurements may be conducted to verify compliance.

Numerous scientific reviews, including assessments by international health authorities, have concluded that current evidence does not establish a clear causal relationship between long-term exposure to low-frequency EMF from power lines and adverse health effects at levels below established guideline limits. As part of the stakeholder engagement strategy, community awareness sessions will include information on EMF, applicable safety standards, comparison with common household exposures, and clarification of scientific findings to prevent misinformation and undue concern.

b) Potential Impacts of transmission lines on the flora

In the ROW of the line, vegetation should always be cleared and removed to avoid affecting operation of equipment and that will be done regularly by clearing. Natural vegetation along theline, especially for the relics of savannas and forest remnant at the side of swamps, will be cleared. Eucalyptus trees will also be eliminated in the ROW, which has an impact on the population's lifestyle and biodiversity in those areas. While these impacts are spatially limited to the approved corridor width, they may result in localized habitat modification and reduction in woody vegetation cover.

Vegetation clearing could disturb wildlife that is in the remnant patches of gallery forest and swamps, by putting more pressure on animals that live in that environment. The population along that line could take advantage of that vegetation clearing to hunt fauna that lives in that area.

To manage and minimize operational impacts on flora, the following measures will be implemented: Restrict vegetation clearing strictly to the approved ROW width; Apply selective trimming rather than complete clearing where technically feasible; Prohibit the use of chemical herbicides (phytocides) for vegetation control; Implement compensatory tree planting or habitat restoration measures where significant vegetation loss is unavoidable, in coordination with relevant authorities.

c) Impacts on Fauna – Birds and Bats

The construction and operation of transmission lines can pose significant risks to avifauna and bats, particularly through collisions and electrocutions. These impacts are especially critical near wetlands, rivers, and other water bodies, which often host large populations of waterbirds and serve as important foraging and nesting habitats for raptors. In addition, bats are vulnerable due to their flight patterns and echolocation behavior, which can be disrupted by overhead infrastructure. If the transmission line crosses internationally recognized bird or bat migration routes or regionally important flyways, the magnitude of these impacts increases substantially. However, the transmission line does not cross any internationally recognized bird or bat migration routes and no bat was spotted in the line route. The assessment confirms that no significant bird or bat migration routes, flyways, or key habitats exist within or near the Right of Way (RoW) of the Bwishyura–Kigoma Transmission Line. The project traverses mainly less densely settled areas, farmlands, and degraded vegetation, with limited wetland or forest cover capable of supporting large raptors or bat colonies. Occasional presence of common resident bird species and insectivorous bats may occur, but collision or electrocution risks are minimal

Official Use Only

and localized. As a precautionary measure, the Environmental and Social Management Plan (ESMP) will include specific mitigation actions such as: (1) alternative alignments to avoid flyways, migration routes, and areas such as wetlands where birds and bats susceptible to this impact are likely to be present; (2) alternative tower designs for those areas to produce a configuration of conductors least likely to result in collisions; (3) installation of bird warning devices or diverters on the lines in those areas.

To mitigate these risks, careful route selection to avoid these sensitive ecosystems was done.

d) Potential Positive Social Impacts

Availability of reliable electricity supply in the National grid due to the network strengthening and this will finally contribute to the improvement of socio-economic status of the population in general. Among indirect impacts that would results in the reliable and stable grid would be that different residential areas, commercial centers, handcraft businesses, Schools, Public utilities, Water Supply infrastructures like water treatment plants and water pumping systems, public offices among many others could profit from a permanent and stable electricity supply.

As a consequence, the quality of life and extent of economic opportunity will be transformed. Social and environmental costs, not least in noise and air pollution, associated with existing generator usage will be reduced, with more limited requirement for firewood cutting and collection.

While major attention will focus on loss of income due to temporary disturbance to fields or grazing areas, and on potential health and social risks associated with any non-local specialist workers who may be required, positive opportunities to PAPs may be presented in the form of temporary employment during the construction phase, as well as through income generated by the sale of food and other consumables to the project workforce.

It is expected that the proposed project will create numerous direct jobs, many of which will be sourced from the project area. A significant proportion of these jobs will go to people in the lower income brackets. Direct income effect will come from salaries and wages paid to workers and income from locally sourced contracts for services such as security, bush clearing, catering and transport. The project will thus give a boost to the local economy, indirectly benefiting small-scale farmers and local small enterprises.

6.7.3. Negative Impacts

The main potential adverse impacts of the Project would occur mainly during the construction stage in the form of:

Table 17: Quantification of negative impacts caused by the proposed TLs

Criteria	Numbers
i. Total land area affected by the transmission line RoW/corridor	169.5 ha
ii. Total land area for crops such as plantations affected by the transmission line RoW/corridor	146.5 ha
iii. Total forest area affected by the transmission line RoW/corridor	10.8 ha
iv. Total residential area affected by the transmission line/corridor	0.7 ha

Official Use Only

v. Total No. households and persons affected by the RoW	982 HHs with 3,332 PAPs
vi. Total No. households and persons affected by the transmission line (TL traversing the residential dwellings) and the installation of towers (separately for the line and the towers)	56 HHs will be physically displaced representing 223 PAPs distributed in both districts; 26 HHs with 97 PAPs in Karongi and 30 HHs in Ruhango district with 126 PAPs
vii. Total No. commercial structures affected by the transmission line (TL traversing the commercial structures) and the installation of towers and their No. of owners (separately for the line and the towers)	5
viii. Total No. ancillary structures affected by the transmission line and the towers and their No. owners (separately for the line and the towers)	0
ix. Total No. common properties affected by the transmission line (TL traversing the common properties) and the towers (separately for the line and the towers)	6
x. Affected No. vulnerable households and persons	75
xi. No. timber and fruit-bearing trees to be affected disaggregated by their species types and sizes (large/medium/small)	Large: 1,568 Medium: 1,987 Small: 4,356
xii. Describe whether this project requires physical relocation and resettlement of affected parties?	56 households will be physically relocated representing 223 PAPs because their houses are located under the proposed line and their houses will be demolished.

Furthermore, the anticipated impacts will be:

- Temporary and limited air and noise pollution due to construction activities;
- Loss of biodiversity as a result of loss of flora and loss ofhabitat for fauna;
- Increased risk of communicable diseases during the construction phase.
- Additionally, potential public safety hazards are enhanced for a project such as the proposed transmission line project when the local population has not been properly educated and sensitized with regard to the potential hazards. Permanent loss of land will happen for towers location due to land acquisition needed for their establishments.

6.8. Summary of Potential Impacts

The description of the impacts of constructing the 220 kV line is given in Section 6.7, and the mitigation of each impact is set out in the ESMP (Table 19). Table 18 presents the summary of the project's impacts on the natural environment, with each impact scored using the method described in Sections 6.4.3 and 6.4.4.

Official Use Only

Table 18: The summary of the project's impacts on the natural environments.

Phase of Works	Environmental Component	Type of impact	Duration of impact (D)	Extent of impact (E)	Intensity of impact (M)	Reversibility (R)	Probability (P)	Consequence C = M+E+D+R	Significance S = C x P	Significance rating (Table 15)
Construction										
Loss of land	Social	Opportunity cost for the landowner to use the land concerned by ROW	Permanent (5)	Local (2)	Moderate (3)	Reversible (3)	Definite (5)	13	65	Moderate to High
Loss of commercial trees	Social	Opportunity cost to grow and get income from selling the Trees	Permanent (5)	Local (2)	Low to moderate (2)	Completely reversible (1)	Definite (5)	10	50	Moderate
Public safety related to electricity mishandling	Social	Risk of electrocution due to little experience with electricity	Temporary (2)	Local (2)	Low to moderate (2)	Reversible (3)	Probable (3)	9	27	Low to Moderate
Marking and clearing of the ROW	Flora	Destruction of vegetation coverage	Permanent (5)	Common (3)	Moderate (3)	Reversible (3)	Definite (5)	14	70	Moderate to High
	Fauna	Loss of habitats	Permanent (5)	Common (3)	Low (1)	Reversible (3)	Highly probable (4)	12	48	Moderate
Earthworks including preparation of access tracks and foundations of towers	Soils	Erosion Formation of road ruts	Temporary (2)	Common (3)	Low to moderate (2)	Reversible (3)	Highly probable (4)	10	40	Moderate
	Water	Contamination by accidental discharges of contaminants Modification for surface drainage or sedimentation and turbidity in waterways	Temporary (1)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Possible (2)	5	10	Low

Official Use Only

Phase of Works	Environmental Component	Type of impact	Duration of impact (D)	Extent of impact (E)	Intensity of impact (M)	Reversibility (R)	Probability (P)	Consequence C = M+E+D+R	Significance S = C x P	Significance rating (Table 15)
		as a result of erosion.								
	Air	Liberation of dusts and gas	Temporary (1)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Definite (5)	5	25	Low to Moderate
	Flora	Destruction of species	Permanent (5)	Specific (1)	Low to moderate (2)	Reversible (3)	Probable (3)	11	33	Low to Moderate
Site installations including storage and work areas	Soils	Contamination by domestic materials	Temporary (1)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Probable (3)	5	15	Low
	Water	Contamination through solid, liquid or hazardous materials and wastewater	Temporary (1)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Probable (3)	5	15	Low
Presence of workers	Water	Overexploitation of resource	Temporary (2)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Probable (3)	6	18	Low
	Flora	Harvest trees as fuel	Temporary (2)	Specific (1)	Low to moderate (2)	Completely reversible (1)	Probable (3)	6	18	Low
	Fauna	Disturbance of fauna and Poaching	Temporary (2)	Specific (1)	Moderate (3)	Irreversible (5)	Highly probable (4)	11	44	Moderate
Transport and circulation	Air	Noise and dust	Temporary (2)	Specific (1)	Low to moderate (2)	Completely reversible	Definite (5)	6	30	Low to Moderate

Official Use Only

Phase of Works	Environmental Component	Type of impact	Duration of impact (D)	Extent of impact (E)	Intensity of impact (M)	Reversibility (R)	Probability (P)	Consequence C = M+E+D+R	Significance S = C x P	Significance rating (Table 15)
						(1)				
Operation										
Maintenance of ROW	Flora	Destruction of vegetation cover disturbance of fauna, generation of waste	Permanent (5)	Common (3)	Moderate (3)	Reversible (3)	Definite (5)	14	70	Moderate to High
Presence of power line	Fauna	Bird collisions and electrocutions	Permanent (5)	Specific (1)	Moderate (3)	Reversible (3)	Highly probable (4)	12	48	Moderate
	Landscape	Visual degradation of landscapes	Permanent (5)	Specific (1)	Moderate to high (4)	Reversible (3)	Definite (5)	13	65	Moderate to High

Note: M = magnitude/intensity, E = extent, D = duration, R = reversibility, P = probability (scores from Table 14); C = M + E + D + R; S = C × P; the significance class follows the bands in Table 15. Ratings are before mitigation; ratings after mitigation are in Table 20.

Official Use Only

Chapter VII: Mitigation & Enhancement Measures

7.1. Impact mitigation measures

All the proposed mitigation measures should be implemented during construction and integratedin the contractor's Agreement if appropriate.

7.1.1. Mitigation measures during the pre-construction phase

7.1.1.1. Establishment of project and landscape mitigation measures

The efficient reduction of the visual impact of pylons or transmission lines is generally difficult. Therefore, it is preferable to talk about landscape mitigation measures. Visual absorption is indeed only provided for when the visibility area is reduced, the "complex" landscape (including many components), and less "readable" (disorganized). In practical terms, absorption may be achievedby putting the line along the edge, turn around a line of ridge, etc.

The success of landscape mitigation measures results from the use of landscape components (vegetation, relief, and housing) and consideration of visibility zone. Inclusion of a power line into landscape is therefore facilitated by the presence of large size components near it. The observerthen tends to underestimate the real size of towers in regard to what surrounds them. In contrast, when other components of the landscape are of small size, then pylons will appear big.

Also, the peri-urban environment with small size will not be able to dissimulate the structures.

It is possible to mitigate the effect of vertical structures by proposing lower towers and therefore less spaced, but also by establishing structures in such a way as to seek visual support on slopes in order to follow best the shapes of the landform.

In case avoidance of the visual perimeter is not possible, it should be advisable searching for mountain slopes, and they should be kept away if possible from the areas of ridge crossing.

The impact introduced by the establishment of a HV link may be mitigated by using at best existing configurations and by choosing the best-adapted technical infrastructure.

In semi-urban environments, solutions to mitigate the visual impact may be an alignment of pylons because a less rectilinear layout will cause an impression of "visual disorder".

7.1.1.2. Soil conservation

During the planning and especially access to work sites, impacts regarding risks ofincreased erosion or deterioration of soils may be mitigated through:

- The use of existing tracks, if possible.
- The creation of new tracks restricted to its minimum needed and in consultation withinterested landowners and authorities.

7.1.1.3. Special provisions to be included in Contractors' contract

Apart from the measures considered during the design, preventive measures will be also implemented during realization of works.

Thus, in the context of works that the Promoter undertakes or has undertaken by others, he willdefine general and technical clauses for supply, setting and test of network, supply and erectionof electric equipment, as well as implementation of all works related to the project.

Those clauses constitute the best practices in terms of construction of electric network and ensure the project is well integrated into the environment. The successful bidder for the project must comply fully with the laws and regulations in force in Rwanda, regarding environment protection and rehabilitation of environments affected by the project. Additionally, the contract will have to require from the Contractor to prepare and implement:

Official Use Only

- A drainage and erosion control plan;
- A rehabilitation plan for disturbed areas;
- A waste management plan;
- An emergency plan in case of spilling of contaminants;
- A fuel and other hazardous materials management plan.

In addition to those clauses, specific mitigation measures recommended in the context of the environmental and social study should also be included into the project and their implementation will have to be enforced during works through environment and social risk management and monitoring program.

7.1.2. Mitigation measures during the construction phase

7.1.2.1. Site organization

Among the measures that will have to be implemented and respected in the site general organization during construction works, there are:

- To mark out physically (pegging, ribbon, etc.) the limits of the ROW within which works will have to be undertaken;
- On cultivated land, to make only one provisional access track in consultation with the owners and occupants before opening the site;
- On the site and access roads' area, to restrict work timetable between 07h00 and 18h00 in order to limit disturbance of local populations with noise;
- The Contractor must regularly maintain equipment (air hammer, compressors, pile drivers, crushing machines, etc.) and any other noisy material that constitute sources of significant nuisance. He also must ensure that silencers of his machinery are always in good condition.
- To undertake preventive maintenance of machinery and vehicles in order to prevent fuel and lubricant leakages.
- To take necessary measures to avoid any spillage of oil products during supply of vehicles and machinery, and to provide for an emergency plan in case of accidental spillage of contaminants;
- To have at disposal a response kit in case of accidental spillage of contaminants near the place where works are being undertaken.

Material Storage and personnel office area will be equipped with septic tanks and disposal fields to receive wastewater or latrines (at minimum one for 20 people).

In accordance with the Plan for storage of fuel and other hazardous materials, the Contractor must recover and store in liquid tight containers, correctly identified, all hazardous materials and contaminant products generated in the normal course of site operations (used oils,solvents, plasters, etc.), then send them via licensed haulers to potential take-overs or another site with appropriate authorization to handle them. Vegetation to be cleared from the Right of Way (RoW), including crops and trees, will be harvested by the owners prior to the commencement of construction activities, following advance notification. During bush clearing, all removed materials shall remain the property of the Project Affected Persons (PAPs), who will be permitted to use them for their own benefit in addition to receiving full replacement compensation. This is done to help them restore their livelihood.

At the end of works, the Contractor will ensure that the site is restored to its initial condition andwill clean up all materials, wastes and littering. All the surfaces affected will have to be restoredto their

natural condition or to the nearest possible condition to the initial condition; similarly, siteareas will have to be rehabilitated after the completion of works.
During the whole duration of works, the Officer in charge of environmental and social risks will ensure compliance with all environmental standards and implementation of environmental recommendations. Implementation of those general measures of site organization will therefore help to mitigate the project's incidences on environment and integrate it harmoniously into the environment.

7.1.2.2. Solid waste management

Solid waste management is a major issue in such kind of project. Indeed, the project will extendto several sites distributed over a distance of several kilometers. Production of solid wastes (non-dangerous) should be likened to the one of a small town. Littering collection is then at risk of meeting serious logistic issues. Waste management systems in sections crossed are indeed often lacking. Before starting the work, the Contractor shall submit a waste management plan for approval. The project promoter should encourage the three Rs: Recover, Reuse, and Recycle. The use of hazardous materials must be reduced or eliminated, and the use of public landfills must be restricted as much as possible.
Construction debris (woods, steel, cartons etc.) produced on work sites should be picked up with work progress on site. Then those debris will be recovered and recycled or otherwise eliminated, either by disposal in controlled landfills, or by burial in an appropriate site, approved by the SESO and by local authorities.
In all cases, the Contractor will be responsible for the sound waste management on construction site and in storage area. In addition, before starting of works, the Contractorwill have to submit a Waste Management Plan to the SESO for approval.

7.1.2.3. Oil products management

Fuel needs for the site machinery and generation of power (generators) required for site works will have to be specified. It seems probable that the Contractor must prepare a fuel storage park and install oil product tanks and secondary containment to meet the needs.
Before starting works, the Contractor will have to present a Management Plan for fuel and other hazardous materials. That plan includes, among other things, an estimate of fuel needs, location and mode of storage, as well as environmental protection measures that will be taken, including a contingency plan in case of accidental spillage. The Plan will also have to provide for areas dedicated for maintenance of site vehicles (oil change, repair, etc.).
In case of contamination, costs for soil and water rehabilitation are at the Contractor's charge.

7.1.2.4. Protection of natural environment and vegetation

Measures shall be implemented during the marking and initial clearing of the ROW:

a. Before clearing the ROW and work areas, the Contractor will have to ensure first of all that the limits of clearing were marked on the ground before the start of work, with markers, and he must obtain authorization from the site environmental social risk management officer;
b. The SESO will ensure to respect the limits of deforestation that will have been indicated at the construction site;
c. Only the clearing needed for construction works is authorized. The clearing must be limited to the minimum required;

Official Use Only

e. To conserve all the vegetation (trees, shrubs, herbaceous, crops) present at the edge of watercourses and on steep slopes;
f. In order to respect the flow of water and biodiversity, to maintain watercourses, streams, swamps and trenches free of any vegetation debris or any other wastes;
g. Wood harvested must be cut into sections, put and left on site for the benefit of landowners or the community;
h. To compensate the loss of tree vegetation by planting of equivalent areas.

7.1.2.5. Wildlife protection

In order to protect wildlife resources often already at risk:

- To forbid collection of fauna or flora species;
- To prohibit possession of firearms on site and to prohibit hunting and fishing activities atall times for construction site workers;
- To strictly control poaching and take the offenders to the authorities.
- To avoid the construction of towers in the wetlands, water courses or their buffer
- To avoid the construction in the sensitive or protected area.

7.1.2.6. Water protection

Several measures need to be implemented in order to limit accidental risks of polluting surface water and ground water:

- No watercourse may be forded. To erect preferably a bridge or a culvert to allow vehicles and construction equipment to cross a watercourse. The construction of such facilities must respect best practices and should not reduce the width of the watercourse by more than 20%. Their size must allow free flood flow. They should not either impede migration of fish. During the development of such facilities, to avoid sensitive periods such as high waters or spawn of fish.
- To protect ground water during construction, ensure that no tower is erectedin a distance less than 50 m around a well or borehole serving for drinking water supply.
- To forbid any temporary or permanent disposal of excavated materials in a watercourse or in an environment likely to be flooded, except for towers and tower struts;
- To prohibit supply of vehicles and machinery and maintenance of equipment (oil change, repair) at less than 30 meters from watercourses and flood-prone areas;
- To prohibit any storage of fuel at less than 60 meters from a watercourse. The Contractor will have to seek approval by RSE for locations that may serve for handling and storage of hazardous materials;
- Before beginning of works, to require from the Contractor to submit an emergency plan in case of leakage or accidental spillage of contaminant;
- In case of pollution, to trigger the procedure of intervention in case of emergency provided for in the above-mentioned plan.
- Avoid to erect the towers in the water courses or its buffer.

During the wet season, heavy rains may be responsible for surface soil erosion. Thus, materials accumulated for constructions of the track or substations are likely, if their grains are very fine, to be carried away and transported towards watercourses by increasing therefore the already high turbidity of water during this season.

Before start of works, the Contractor must submit an erosion control plan to the RSE for approval. He must install devices for retention and sedimentation of suspension particles (deflectors, pits).

Official Use Only

7.1.2.7. Earthworks

A series of measures must be introduced to limit general impacts of earthmoving.

- To require from the Contractor to present a drainage and erosion control plan;
- To reuse materials resulting from spoils such as ballast materials, if their geotechnical features allow. Otherwise, to dispose all excess materials (soil, stones, blocks, etc.) in such a way as to reduce their visual impact and allow theiroptimal integration into the surrounding landscape. To backfill areas of disposal of materials so that once they are completed, their final geometry fits in the natural shape of land and facilitates their integration to the landscape.
- Not to authorize any solid waste (wood, steel, etc.) nor contaminated materials in the ballasts.
- If need be and if possible, to stabilize, to drain and to pitch or replant spoils and ballasts.
- In order to limit at maximum, the loss of arable soils during earthmoving, to scour and separately store the layer of top soil, then to proceed to excavation in depth ofthe remainder soils;
- The Contractor will have to prepare and implement a plan for rehabilitation of disturbed areas including areas of storage of ballast materials;
- Immediately after intervening in one section, and without waiting for the end of work site, to stabilize soils against erosion by using indigenous species with rapid growth;
- At the end of works, to reuse the top soil for rehabilitation of disturbed sites;
- Not to wait until the end of construction work to proceed to rehabilitation works of disturbed areas, but to proceed with progress of works;
- To check performance of stabilization measures after rains and to take necessary corrective measures to ensure efficiency of measures in the future;
- During earthmoving works near residences, to use water as dust suppressor in order to reduce at minimum the dust coming from movement of trucks and other construction equipment.

7.2. Mitigation measures during the operation phase

During the operation phase, mitigation measures of impacts will have to be implemented, namely:

- To use mechanical methods for vegetation control in the ROWs instead ofphytocides;
- To promote the use of ROW for farmers in order to reduce the use of vegetation control methods;
- Mitigate bird collisions and electrocutions by considering the following: (1) alternative alignments to avoid flyways, migration routes, and areas such as wetlands where birds and bats susceptible to this impact are likely to be present; (2) alternative tower designs for those areas to produce a configuration of conductors least likely to result in collisions; (3) installation of bird warning devices or diverters on the lines in those areas.
- Using insulated conductors and bird-safe tower designs to reduce electrocution risks.
- Installing bird diverters or marker spheres on selected spans near minor wetlands or open water bodies, if any are encountered during construction.
- Implementing nighttime work restrictions where bat activity is noted.

Official Use Only

- Conducting periodic monitoring to detect any unanticipated impacts on avifauna and bats.
  -
  - To introduce a monitoring program for impacts of the line:
    - Avian fauna;
    - Water quality;
    - Erosion;
    - Landscape.

7.3. Mitigation Measures for Social Impacts

Regarding Social Impacts, mitigation measures should include:

7.3.1. Pre-construction phase

Land acquisition will be carried out in accordance with the prevalent domestic laws and World Bank policies on land acquisition, restrictions on land use and involuntary resettlement, which require identification and quantification ofany impacts on land-based livelihood, and adequate compensation to landowners and people relying on the land for their livelihood. The compensation would be paid, before the start ofwork as per the resettlement plans.
A detailed analysis of resettlement impact and mitigation strategies is done in the context of the Resettlement Action Plan.

7.3.2. Construction Phase

The basic environmental management principles to follow during construction of the HV transmission lines are outlined below. Adherence to these guidelines will further reduce the potential adverse impacts which may arise during construction:

- Consult villagers regarding location of valued village resources and locate transmissionlines to avoid these features.
- Minimize the need to construct new access tracks wherever possible.
- Use existing access roads and tracks wherever available.
- Ensure minimum clearance distances between conductors and ground, waterways, roadcrossings, buildings, communication systems etc.
- Clear only a narrow path to facilitate pulling the nylon rope between towers to stringconductors.
- Strictly define ROW clearing activities in the contract specifications.
- String conductors under tension to minimize potential damage to remaining ground vegetation.
- Decommission and rehabilitate excess temporary access tracks as soon as they are no longer required.
- Construction to proceed in the dry season if possible, to minimize soil erosion and mass wasting and to limit loss of crops (which are not grown in the dry season); where construction is required in the rainy season, potentially unstable slopes to be avoided.

Gender-Based Violence (GBV) / Sexual Exploitation and Abuse (SEA):

- Enforce a strict Code of Conduct (CoC) for all workers and contractors.
- Provide training and awareness sessions on GBV/SEA prevention for workers and communities.

- Establish a safe, confidential Grievance Redress Mechanism (GRM) that is accessible to women and vulnerable groups.
- Partner with local NGOs or service providers to support survivors of GBV/SEA.

Labor Influx (no worker camps; contingency measures apply to specialist workers only):

- Recruit unskilled and semi-skilled labour from the host communities. The project position is that no worker camps will be built and no general labour influx is expected.
- Prior to mobilization, the Contractor shall prepare a proportionate labour and community interaction plan in coordination with local authorities. The plan shall prioritize local recruitment and confirm that no worker camps are planned. If non-local specialist personnel are required, the plan shall set out their accommodation arrangements, expected duration, conduct requirements, community liaison arrangements, and measures to prevent GBV/SEA and pressure on local services.
- Monitor worker behavior and community relations through regular social monitoring.
- Contingency measure, for specialist workers only: no worker camps will be built. If specialist workers from outside the area have to be accommodated, they will stay in rented lodging in existing towns, and the Contractor will apply clear accommodation rules to them, including curfews, restricted movement and no-contact policies with minors. If a camp later becomes unavoidable, it will not be set up until this ESMP and the labor influx management plan have been updated and approved by REG/EDCL and the World Bank.
- Report monthly to REG/EDCL on the number of workers recruited locally and the number brought in from outside the area, and keep these records available for supervision missions.

Traffic Impacts:

- Prepare and implement a Traffic Management Plan (TMP) in collaboration with traffic police.
- Schedule movement of heavy vehicles during off-peak hours.
- Install warning signs, speed control measures, and ensure safe pedestrian crossings near schools and populated areas.
- Conduct road safety awareness campaigns in affected communities.

Disease Transmission (including STIs, COVID-19, etc.):

- Provide health screening for workers before mobilization and periodically during construction.
- Ensure access to basic health services and first aid per field construction team.
- Organize community health awareness campaigns, including STI/HIV and hygiene education.

All site clearance works shall be carried out within defined perimeters and only when necessary. The maximum permissible time lapse between site clearing and initiation of construction operations shall be reduced to a minimum. Vegetation along the ROW shall be kept to thebarest minimum to permit safe operation. Trees felled from site shall be re-utilized for the benefitof the host communities or as otherwise requested in consultation with the communities. Areas cleared in excess of operational requirements during construction shall be restored with indigenous species and maintained for at least three years.

Official Use Only

7.4. Environmental and Social Management Plan (ESMP)

The Environmental and Social Management Plan (ESMP) provides the conditions under which the project must be implemented, upon approval from the Rwanda Development Board (RDB)[9]. The provisions of the ESMP must be implemented in final design stages, as well as the construction and operational period of the project. The provisions of the ESMP, as related to thepending approval from REMA, would in the case of approval, be legally binding. It is thus critical that the provisions of the ESMP be fully implemented to enhance positive impacts and avoid significant negative environmental and social impacts.

It is important to note that this ESMP is focused on the design, construction and operational phases of the proposed project. Preliminary design specifications from an environmental and social point of view were taken into consideration in the assessment and compilation of the ESIA, providing input with regards to possible mitigation measures to reduce environmental and social impacts.

7.4.1. Roles and Responsibilities:REG's Role

REG, as the proponent of the project, is responsible for the effective implementation of the project, in compliance with all approvals. REG must ensure compliance with the conditions inherent to the ESMP approval by RDB[4]. REG is the project proponent and shall therefore be the entity responsible for monitoring the implementation of the ESMP and compliance with the RDB Certificate of Approval. However, REG will appoint a construction Contractor, who will be responsible for implementing the proposed construction of the 220 kV Bwishyura–Kigoma transmission line and hence implement the proposed mitigation measures documented in this ESMP. REG shouldalso appoint an Environmental Supervising Consultant to monitor and report on compliance withESMP, as has been elaborated upon below.

7.4.2. REG's Environmental and Social Specialists

For the purposes of implementing the conditions contained herein, the REG's Environmental Specialist shall be the responsible person for ensuring that the provisions of this ESMP, as well as the Certificate of Approval once/if issued by RDB, are complied with during the planning, construction and operation of the power distribution project. The REG Environmental Specialist and/ or appointed E&S Supervising Consultant/s will be responsible for issuing instructions tothe Contractor where environmental and social considerations call for action. The REG Environmental and social Specialist and/or appointed E&S Supervising Consultant/s shall submit regular written reports to REG, but not less frequently than on a monthly basis.

The REG Environmental Specialist and/or appointed E&S Supervising Consultant/s will be responsible for the monitoring, reviewing and verifying compliance with the ESMP andconditions of the Certificate of Approval by the Contractor. His / Her duties in this regard will include, *inter alia*, the following:

- Confirming that the Certificate of Approval and all permits required in terms of the applicable legislation have been obtained prior to the activity commencing.
- Monitoring and verifying that the ESMP and Conditions of approval in the Certificate are always adhered to and taking action if environmental and social specifications are not followed.
- Monitoring and verifying that environmental and social impacts are prevented or kept

toa minimum.

- Reviewing and approving method statements, to ensure that the environmental and social specifications contained within this ESMP and Certificate of Approval are adhered to;
- Inspecting the site and surrounding areas on a regular basis with regards to compliance with the ESMP and Certificate of approval.
- Monitoring the undertaking by the Contractor of environmental and social awareness training for all new personnel on site during construction and for maintenance activities during operation.
- Ensuring that activities on site comply with all relevant environmental and social legislation.
- Ordering the removal of person(s) and/or equipment not complying with the specifications of the ESMP and/or Certificate of approval.
- Undertaking a continual internal review of the ESMP and submitting any changes to REG and/or RDB and the concerned Lead Agencies (in case of major changes) for review and approval.
- Checking the register of complaints maintained and ensuring that the correct actions are/were taken in response to these complaints.
- Liaise on a monthly basis with the relevant Local Grievance Redress Committees, and higher-level Grievance Redress Committees, as necessary.
- Checking that the required actions are/were undertaken to mitigate the impacts resulting from non-compliance.
- Reporting all incidences of non-compliance to the management of REG.
- Conducting monthly environmental and social performance audits in respect of the activities undertaken relating to the project.
- Keeping a photographic record of progress on site during construction from an environmental and social perspective.
- Recommending additional environmental and social protection measures, should these be necessary; and
- Providing report back on any environmental and social issues at site meetings.

The REG Environmental and social Specialists and/or appointed E&S Supervising Consultant must have:

(i) A good working knowledge of all relevant environmental and social policies, legislation,guidelines and standards both locally in Rwanda and internationally.
(ii) The ability to conduct inspections and audits and to produce thorough, readable and informative reports.
(iii) The ability to manage public communication and complaints.
(iv) The ability to think holistically about the structure, functioning and performance of environmental systems; and
(v) Proven competence in the application of the following integrated environmental management tools (including, Environmental and Social Impact Assessment, Environmental and Social Management Plans/Programs, Environmental and Social Auditing, mitigation optimization of impacts, Monitoring and Evaluation of Impacts and Environmental and Social Management Systems).

The REG Environmental Specialist and/or appointed E&S Supervising Consultant/s must befully conversant with the ESMP and Certificate of Approval (once considered and issued) for theproposed construction of the distribution line and ensure compliance with all relevant national environmental legislation and international good practices.

7.4.3. Contractor's Role

The Contractor is responsible for constructing the power lines, within the conditions of the ESMP, and is liable to pay fines for transgressions and non-compliance with the provisions ofthe ESMP. The construction Contractor must, in line with this ESMP, prepare a document clearly outlining and demonstrating the environmental and social responsibilities, accountability and liability. The Contractor shall assign responsibilities for the following:

a) Documenting the required environmental and social policy and strategy;
b) Respond to all environmental and social aspects which require action, under the coreelements and sub-elements of the ESMP through compiling E&S Action Plans;
c) Overall design, development and implementation of the Method Statements;
d) Reporting structures;
e) Actions to be taken to ensure compliance; and
f) Implementing the ESMP in all stages/phases of the power distribution project.

All official communication and reporting lines including instructions, directives and information shall be channeled according to the organizational structure developed by the Contractor and approved by the REG Environmental and social Specialist and/or E&S Supervising Consultant/s. TheContractor will provide for personnel to deal with stakeholder liaison and grievance procedures. The Contractor shall further:

a) Be responsible for the finalization of Action Plans and Method Statements under the ESMP, prior to project commencement where necessary, which through being implemented will achieve the environmental and social specifications contained within the ESMP and the relevant requirements contained in the Certificate of Approval, once/if issued by RDB;
b) Be responsible for the overall implementation of the ESMP in accordance with therequirements of REG and the Certificate of Approval, once/if issued by RDB;
c) Ensure that all third parties who carry out all or part of the Contractor's obligations underthe Contract, comply with the requirements of this ESMP; and
d) Work closely with the REG E&S Specialist and/or the E&S Supervising Consultant/s.

7.4.4. Role of REG Environmental Officer and External E&S Supervising Consultant

REG, as the proponent of the project, is responsible for putting in place an Environmental and social, with the option to appoint an external Environmental & Social (E&S) Supervising Consultant/s, to provide the required support for the duration of at least the construction phaseof the project. REG and Supervising consultant will have the role of reviewing and approving the contractor's environmental plans: CESMP, OHS Plan, Waste Management Plan, Erosion Control Plan. The E&S must monitor and report on compliance with the project approvals andthe provisions of the ESMP. In the case of an external E&S Supervising Consultant/s being appointed, such can act as an independent assessor, auditor and authority on issues of compliance on the Project Site, as required by REMA and reporting directly to REG and REMA,as well as other key stakeholders.

The E&S has the right to issue a stop order on work and/or non-compliance fines, if non-compliance on the part of the Contractor is resulting in significantly detrimental environmental and social impacts.

The intervals at which E&S audits shall be undertaken shall be agreed upon by REG, the Contractor, E&S Supervising Consultant/s and REMA. It is suggested that at least quarterlyaudits, and more regular monthly site monitoring, if necessary, be conducted and reported, withannual audits, and final audit upon completion of the construction phase. An E&S auditprogram should be put in place for the project; to manage the audits and make surecompliance monitoring remains on track. The environmental audit program shall at leastinclude the following:

a) A comprehensive quarterly and annual E&S audit will be undertaken, as well as a final completion audit at the completion of the construction phase to verify compliance withthe ESMP, Certificate of Approval and all applicable environmental legislation. An audit report shall contain recommendations on E&S management activities which are requiredto be implemented within the subsequent phase. The auditor shall report concurrently to the Contractor, REG and REMA;
b) Periodic environmental audits to be undertaken during the operations phase to verify ongoing satisfactory environmental management performance. These audits must be followed up with appropriate remedial and corrective actions as shall the audit findings demonstrate any non-conformance or non-compliance with the specifications of the ESMP; and
c) Compile and agree on (together with REG) a template for the audit report, prior to thecommencement of the project.

7.4.5. RDB and REMA's Role

RDB is responsible for the consideration of the application, to either approve or deny the project. If the project is approved, then RDB is responsible for issuing a Certificate of Approval whereas REMA is responsible of monitoring compliance with the conditions of approval through different inspection and enforcing the compliance to the prepared ESIA Report.

7.4.6. District

District authorities and their respective local government structures in the 2 Districts (Ruhango and Karongi) that are traversed by the proposed power lines will be vital in the implementation of the project by mobilizing political goodwill and sensitizing communities on the project. In addition, the District's Vice Mayors for Economic Development, and Social Affairs, as well as the District Environment Officers (DEOs) and their counterparts at the Sector level will be responsible for reviewing and monitoring the implementation of the environmental and social aspects of the project in their area of jurisdiction. The Vice Mayors and Sector Executives as well as theDistrict Electricity Maintenance Engineers (DEs), DEOs in the respective areas of project implementation will monitor the project to ensure that mitigation measures are adequate and are well integrated in theoverall project implementation framework. The DEs, DEOs and CDOs can also review thisreport and provide comments to REMA, prior to final decision by REMA.

The role of the DEOs will also be to ensure that the proposed project is implemented in accordance with REMA conditions of approval. They will also attend the site inspection and project meetings and be able to point out issues of concern. Specifically, they will oversee implementation of compensation aspects wherever these may arise and other social issuessuch as complaints.

7.4.7. Local Communities

The local communities play an important role in the final design and construction phases. Duringthe ground-truthing of the final designs, Project Affected Persons (PAPs) can give further input into the specific placement of poles and the proposed route, where it affects them directly. Woodlots and crops that are damaged and/or lost due to the project must be dealt with in the RAP. Local communities also have an important role to play in compliance monitoring, to make sure to report any non-compliance issues or concerns to the Local Grievance Redress Committee, DEO, E&S Supervising Consultant, REG, REMA and/or the World Bank.

7.4.8. Other Key Stakeholders

Other key stakeholders relevant for the monitoring of health, welfare and education all play an important role of keeping watch on the project, to all contribute in meaningful ways to the monitoring of the impacts, as well as engaging fully with key issues, to better manage undesirable consequences resulting from infrastructure projects throughout Rwanda.

7.4.9. Physical Cultural Resource (PCR) and Chance Finds Procedure

Chance find procedures under this Project will be designed as follows:

- Immediately stop the construction activities in the area of the chance find.
- Delineate the discovered site or area.
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities take over. The Institute of National Museum of Rwanda shall be responsible for significant movable and immovable cultural property that pertains to Rwanda history, heroes and the conservation of historical artifacts and the National Museum shall be responsible for significant movable and immovable cultural and natural property pertaining to collections of fine arts, archaeology, anthropology, botany, geology, zoology and astronomy, including its conservation aspect. Institute of National Museum of Rwanda Cultural Properties Division shall take over. The address of Institute of National Museum of Rwanda is as follows:
    - Rwanda, Huye
    - Address: SH 1RD 2
    - P.O.BOX 6397, Kigali
    - +250730741093
    - +250783379597
    - E-mail: info@museum.gov.rw
- Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division immediately (less than 24 hours).
- Contact the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division who would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Institute of National Museum of Rwanda Cultural Properties Division (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values.

- Ensure that decisions on how to handle the finding be taken by the responsible authorities and the Institute of National Museum of Rwanda Cultural Properties Division. This could include changes in the layout (such as when the finding is an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage.
- Implementation of the authority decision concerning the management of the finding shall be communicated in writing by the Institute of National Museum of Rwanda Cultural Properties Division; and
- Construction work will resume only after authorization is given by the responsible local authorities and the Institute of National Museum of Rwanda, Cultural Properties Division concerning the safeguard of the heritage.
- These procedures must be referred to as standard provisions in construction contracts, E&S risk management Procedures for Inclusion in the Technical Specifications for Contracts. During project supervision, the Site Engineer in collaboration with the contractor E&S risk management team shall monitor that the above regulations relating to the treatment of any chance find encountered are observed.
- Relevant findings will be recorded by the E&S team and will be reported in the Monitoring and Evaluation Report on a quarterly basis to the World Bank, and Implementation Completion Report on E&S risk management part will assess the overall effectiveness of the project's cultural property mitigation, management, and activities when a chance find is encountered during the implementation.

7.4.10. Implementing the ESMP

The Environment and Social Management Plan (ESMP) must be implemented on condition of approval, with full compliance, to enhance positive impacts and avoid significant negative impacts. The mitigation measures and estimated implementation costs are detailed in this ESIA Report and reporting on actions taken is required on a regular basis.

The mechanism of how to monitor, audit, report and action interventions, is detailed in this ESIA Report.

The costing for the implementation of the ESMP remains indicative, depends on how the project is implemented and will need to be further accurately estimated once the project is divided into implementable sections, or upon appointment of the construction Contractor, as applicable.

The 1st step in implementing the ESMP is for the REG Environmentalist to drive environmental and social, monitoring, compliance auditing and intervention. The appointment of an external and independent Environmental and Social (E&S) Supervising Consultant/s can assist in fulfilling this role.

Official Use Only

Table 19: Environmental and Social Management Plan (ESMP) for construction of 220kV Lines

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
General Provisions					
All impacts	a. Achieve full compliance with the World Bank Environmental and Social Framework (ESF) b. To develop the C-ESMP which is based on-site situations and that applies the relevant mitigation measures. c. The Environmental and social Specialists can issue penalties, in consultation with relevant authorities, for d. incidents of non-compliance, and always in liaison with REMA. e. The contractor shall develop the site-specific Contractor environmental and social management plan (C-ESMP) which will detail management of all issues on site including waste disposal and management, source of local material and management of transportation, personnel at site, expected quantity of waste to be generated and how it will be managed, all sub-plans shall be included in CESMP under the section of Management Strategies Implementation Plans (MSIPs). **Notes:** The sub-project impacts mitigation measures have been analyzed and shall be assessed prior to the project implementation and the conflicts between the mitigation have been considered in different sections of this ESIA. **As the project is still under tender process, the C-ESMP shall detail all the following:** quantities of materials needed during construction and operation, clearly indicated e.g. water, power, lubricants, raw materials, ore, structural components, fill, source of materials, impacts of transportation of all materials, personnel and visitors, means of transporting materials, products, workers, timeline for construction, operation, decommissioning and closure.	Entire Line routes	REG-EDCL	REG/EDCL Environmental Specialist in place. Dedicate the DEO for the project	-

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
All impacts	a. Sensitize all Contractors, including foremen, supervisors and workers in the requirement for and full implementation of the C-ESMP. b. Employ an adequately qualified and experienced Environmental Officer to assist with specific route and pole location of the infrastructure, prior to the construction of such, as well as regular independent monitoring throughout the construction and rehabilitation stages of the project. c. Put in place simple Construction Method Statements for activities in sensitive areas, like wetland areas, forest reserves, areas with natural vegetation and densely populated areas.	Entire routes	Contractor	REG/EDCL Environmental Specialist in place. Dedicate the DEO for the project	45,0000
PRE-CONSTRUCTION PHASE					
Community expectations from the project	a. To organize workshops for information and awareness raising for authorities, community-based organizations/ NGOs and communities at all levels (national, districts and sectors) b. To produce and distribute/disseminate information tools by considering concerns of communities in all communication channels.	Communities located near ROW of each transmission line / substation	REG Project Implementation Unit (PIU) in collaboration with REMA	- REMA. - Self-monitoring - by REG/EDCL	50,000
Planning of environmental management requirements	• Preparation of Contractor's environmental management plans. • A drainage and erosion control plan; • A rehabilitation plan for disturbed areas; A waste management plan; • A response plan in case of spillage of contaminants. • A fuel and other hazardous materials management plan.	All building sites and all activities	Contractor	- REMA. - Self-monitoring by REG/EDCL	To be part of the Contractor budget

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
Authorization for clearing ROW and license to borrow construction materials	• To obtain authorizations from owners and authorities before proceeding with clearing of ROW. • To use only authorized quarries and recognized suppliers of sand, gravels and quarry materials. To respect all requirements of authorizations. • To apply by writing for an authorization to operate a borrowing from landowners with prior commitment to rehabilitate borrow areas to SESO.	In all ROW and work sites	Contractor	- REMA. - Self-monitoring by REG/EDCL	Is part of works to be executed by Contractor
Sources of supply of construction materials	To identify and use quarries recognized by State (quarry materials, gravels and sands).	The riparian area of ROW	Contractor	- REMA. - Self-monitoring by REG/EDCL	Is part of works to be executed by Contractor
Visual quality of landscape	• In case the visual quality of landscapes is affected, to plant tree hedges to camouflage the ROW. • To avoid as much as possible the location of pylons on mountain ridges or vegetation-free hilltops.	Particularly specified places with tourism potential	Contractor	- REMA; - Self-monitoring by REG/EDCL	Is part of the works to be executed
Establishment of worksites and temporary construction site areas	• Before installing storage and personnel office area or other work areas, the Contractor shall submit its location to the EDCL as part of the C-ESMP for approval. The EDCL through the supervising consultant will ensure that the landowner has given his agreement and that the environmental management measures will be introduced. • The site will be limited to the material storage area. Workers will be sourced from the host community, so no worker camp will be set up. • To grant relevant landowners' compensation for their assets and rental of land for	Material storage and personnel office area, landowners and riparian communiti	Contractor	- REMA. - Self-monitoring by REG/EDCL	Is part of works to be executed by Contractor

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	duration of works. • To prepare development plans for material storage and personnel office area and other construction sites and have them approved by EDCL/Supervising firm. • To plan safe discharge of all wastes, avoid spillage, leakages of soil pollutants and water resources of receipt tanks. • The Contractor will be responsible for payments of all costs generated for clean-up of pollutions caused by his activities and will have to fully compensate relevant people. • Supply drinking water and maintain its quality and ensure sanitation and discharge of wastes from construction sites. • Consider facilities of access to existing public infrastructure (roads, drinking water supply, electricity and communication cover). • Consider topography and site soil quality, its location with regard to a wetland (250m). • Provide to EDCL through the supervising consultant for approval, a material storage and personnel office area plan with indications of its limits and an environmental management plan for.	es of all ROWs			
CONSTRUCTION PHASE					
Soils erosion and compaction	• Restrict the activities to the minimum possible; • Use appropriate machinery and/or protective boarding during soil stripping; • Remove and stockpile topsoil, subsoils and any parentmaterial separately; • Use the stockpiled material in the origin area; • Topsoil storage periods shall be kept to a minimum.	All ROWs	Contractor/ REG	- REMA; - Self-monitoring - by REG	Included in the project budget

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
Changes of landscape - Visual impact	• Use paint with colors that match the environment to minimize visual impact of the structure; • Retain a belt of trees/bush around facilities built to minimize visual impact.	All ROWs	Contractor	- **REMA;** - **Self-monitoring by REG**	15,000
Noise and Vibration	• Restrict construction and operation of heavy machines to daylight; • Ensure noise emissions are kept within the Rwanda standards. However, noise limits in World Bank EHSGs should be followed if more stringent than national standards; • Reduce needed truck movements by careful planning of needs of construction material; • Regular and effective equipment maintenance in order to ensure all machinery is in good working order and use does not generate excess noise/vibration. • Etc.	All ROWs	Contractor	- **REMA;** - **Self-monitoring by REG/EDCL,** - **District authorities**	15,000
Loss of vegetation cover and plant diversity	- In areas of dense vegetation cover, the removal of vegetation must be restricted to the minimum necessary width; etc.	All ROWs	Contractor	- **REMA,** - **Self-monitoring by REG/EDCL**	18,000
Disturbance and mortality of terrestrial fauna	- Restrict construction activities to the daylight; - Inspect the area to be cleared for any terrestrial fauna before bush clearing and digging; - Protect any trench left overnight with a net fence to block fauna from being trapped inside; - Capture and release fauna away from the direct influence zone (including	All ROWs	Contractor	**- REMA,** **- Self-monitoring by REG/EDCL**	24,000

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	species trapped in the trenches);				
Disturbance of Surface Water	- Zero liquid effluent during normal operation.	All ROWs	- Contractor/ REG	- REMA, - RNRA, - Self-monitoring by REG/EDCL	
Liquid waste management	- All wastewaters must be contained on site; - Consider reuse, recycling, and treatment of process water where feasible - The quality and quantity of wastewater discharged in the environment, including storm water be managed and monitored and be of adequate quality prior to release;	All ROWs	- Contractor/ REG	- REMA, Self-monitoring by REG/EDCL	20,000
Air Quality Management	- Minimizing dust from open area sources , including storage piles; - Dust suppression techniques should be implemented, such as applying water or non-toxic chemicals to minimize dust from vehicle movements, - Managing emissions from mobile sources, - Avoiding open burning of solid waste.	All ROWs	- Contractor/ REG	- REMA, - Self-monitoring by REG/EDCL	Operational costs

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
Solid waste management	- Waste Prevention: Processes should be designed and operated to prevent, or minimize, the quantities of wastes generated and hazards associated with the wastes generated - Implementation of recycling plans. - All the solid waste should be collected; the biodegradable organic material composted properly on site for manure production and the non-biodegradable disposed of in a public landfill; etc. - Contractor to develop Waste Management Plan	All ROWs	- Contractor/ REG	- REMA, - Self-monitoring by REG/EDCL	12,000
Water Resource depletion	- Environmental conservation education to all communities living closer to water sources - Facilitation of formation and maintaining community based environmental conservation clubs. - Development of Water Resources management plan - Preparation of Climate Change adaptation measures,	All ROWs	- REG/ EDCL, - REMA,	- REMA	30,000
Management of Hazardous Materials and Oils	- Waste separation must be conducted on site; - Develop policies and programs for waste management, storage, recycling and minimization; - Contractor to develop Waste Management Plan and to provide safe and secure storage for hazardous materials.	All ROWs	- Contractor	- REMA, - Self-monitoring by REG/EDCL	20,000
Safety and Security	a) Ensure the general safety and security at all times by providing day and night security guards and adequate lighting within and around the construction site; b) Measures to prevent and control OHS issues during the construction, maintenance and operation of the project should adhere to established national and international OHS guidelines that are specific for electricity distribution line projects. These measures should also have site-specific targets and an appropriate timetable for	All ROWs	- Contractor	- REG/EDCL, - District authorities	25,000

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	achieving them, as related to: • The Contractor should have on site an Occupational Safety and Health Policy and Action Plan addressing workers and PAPs on occupational safety and health issues, workplace conditions, welfare, accidental electrocution, hazardous waste management, general safety requirements, fire preparedness, machinery, plant and equipment, etc. in line with the Occupational Safety and Health Regulation; • The Contractor should conduct HSE sensitization with PAPs directly affected by the project; • The Contractor should have HSE induction for all workers, and undertake daily tool box meetings prior to works; and • Workers should regularly be taken through safety drills and emergency preparedness training allowing for quick and efficient responses to accidents that could result in human injury or damage to the environment. c) The Contractor should involve local leaders in labor recruitment to ensure that people hired have no criminal record, to avoid hiring less desirable employees. d) The local content provision should be emphasized to minimize labour requirements needed from outside the community, as these are locally associated with safety concerns.				
Health related issues due to dust emissions	- Use of wet processes. - Use of Personal Protective Equipment	All ROWs	Contractor/	- REMA - REG/EDCL	45,000

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
Social cohesion or disruption Workforce-related risks: GBV/SEA, child and forced labour, and pressure on local services (a general labour influx is not expected)	a. The Contractor shall prioritize recruitment from host communities and communicate transparently about available jobs and selection criteria. No worker camps are planned. The Contractor shall monitor compliance with workers' Codes of Conduct and provide induction and awareness on local cultural values, GBV/SEA prevention, child and forced labour, community health and safety, and the grievance redress mechanism. The Contractor shall coordinate with local authorities and law-enforcement agencies to address any substantiated misconduct or disputes. If non-local specialist personnel are required, any temporary accommodation and community interaction arrangements shall be proportionate to the actual need, time-limited, documented, and coordinated with local authorities. Contingency measures for non-local specialist personnel apply only if such personnel are needed (Section 7.3.2). These measures do not assume a general labour influx.	All ROWs	Contractor	**REMA REG/EDCL Local authorities**	12,000
Human health	a) A key consideration for the proposed project is the ability to effectively involve key stakeholders in a realistic and positive participatory process to combat gender violence and the abuse and mishandling of women and children on such government infrastructure projects and the Contractor must present a plan to address such; b) A comprehensive HIV/AIDS Awareness and Management Plan must be implemented throughout and for the duration of the construction phase, with post-completion monitoring and reporting to REMA, collaborating with NGOs and CBOs, as possible. c) Sensitization of communities to be conducted and include electromagnetic fields, accidental electrocution, exposure to hazardous waste materials like fuels, oils and	All ROWs	Contractor	REG/EDCL, REMA. Local Authorities	10,000

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	timber offcuts with creosote, safe levels of exposure and related impacts, to avoid speculations				
Gender impacts	a) Conducting appropriate sensitization on gender issues at all levels within the Project Area and creation of awareness on the responsibility of all concerned during the various phases of the project to address specific gender concerns. This should entail consultation with both women and men in the Project Area and within the construction teams. b) REG and the Contractor should ensure that: • effective gender responsive and equality activities under the proposed project are duly defined and implemented through participatory engagement. • the quantifiable and nonquantifiable, gender and social mitigation measures related to direct and indirect impacts are achieved; and • a social specialist is deployed on the project to oversee among others, gender mainstreaming in the project cycle, is implemented. c) HIV/AIDS awareness campaigns must be regularly conducted for workers and local communities, as well as activities promoting access to health services, treatment and counselling.	All ROWs	Contractor / REG	**REG/EDCL, Local Authorities**	10,000

Official Use Only

Impact	Suggested Mitigation Measures		Location	Responsible	Monitoring	Estimated cost (USD)
Vulnerable groups	a) A Child Protection Plan will be developed and provided to all the Contractors and school management to discourage the Contractors from using children as laborers. In addition, Contractors will be required to avoid employing workers who are below eighteen years old. They will also be required to keep records that show the ages of their workers. b) Ensure that the community and local leadership have access to and know of and report abuse using the national child abuse hotline 116. The existence of the hotline can be displayed throughout near the construction site and in the community at large. c) The Contractor should ensure that mechanisms for close monitoring of worker's behavior/conduct are in place e.g. Contractor could discreetly engage the police to identify anonymous informers from among the workers to monitor and report any negative behavior by the workers including child abuse related misconduct, display a call line or suggestion box where the community can provide feedback on workers behavior. d) REG and the Contractor should ensure that all local leaders and women/child representatives	All ROWs	Contractor / REG-EDCL	REG/EDCL, REMA. Local Authorities		10,000

Official Use Only

Impact	Suggested Mitigation Measures		Location	Responsible	Monitoring	Estimated cost (USD)
	are fully oriented to the labour force related risks for children engaging in construction related activities. e) Talks with the Contractor and his workforce by relevant officials (including the police) on child protection should be encouraged and appropriately scheduled, including continuous popularization of the child help line 116. Parents/guardians should be sensitized and held accountable for children leaving and arriving home before dark. f) Conducting appropriate sensitization on gender issues at all levels within the Project Area and creation of awareness on the responsibility of all concerned during the various phases of the project to address specific gender concerns and especially as they relate to women. This should entail consultation with both women and men in the Project Area and within the construction teams. g) HIV/AIDS awareness campaigns for workers and local communities and activities promoting access to health services, treatment and counselling h) REG/EDCL and the Contractor should ensure strict compliance with the provision of relevant					

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	safeguard compliance with respect to persons with disabilities. REG, REMA and the Contractor should ensure that there is full and effective participation of persons with disabilities and other vulnerable groups, like children and through representative organizations, in all phases. **Crime and community safety:** **Security Measures**: • **Fencing and Gates**: Secure the site with sturdy fencing and controlled access gates to prevent unauthorized entry. This can be supplemented with warning signs around the perimeter. • **Lighting**: Install adequate lighting to deter criminal activities at night and ensure that dark areas are minimized. • **Surveillance**: Use CCTV cameras to monitor the site, especially in areas where valuable materials are stored. This can act as a deterrent and help law enforcement in the event of a crime. • **Security Personnel**: Employ security guards to patrol the site, particularly during non-working hours. Guards can check for unauthorized access, vandalism, or theft.				

Official Use Only

Impact	Suggested Mitigation Measures		Location	Responsible	Monitoring	Estimated cost (USD)
	• Contractor to develop a Traffic Management Plan **Inventory Management and Equipment Tracking**: • Implement inventory control measures, such as logging equipment and materials, to track their movement on and off the site. • Use GPS tracking on high-value equipment to locate stolen items or monitor unauthorized usage. **Access Control**: • Ensure that only authorized personnel have access to the site. This can be achieved through ID badges, biometric scanners, or digital keycards. • Secure storage areas where tools and equipment are kept, using locked containers or enclosed storage facilities. **Community Engagement**: • Hold meetings or outreach sessions with the local community to inform them about the construction timeline, activities, and safety precautions. This helps build trust and encourages the community to report suspicious activities. • Maintain clear communication channels					

Official Use Only

Impact	Suggested Mitigation Measures		Location	Responsible	Monitoring	Estimated cost (USD)
	(hotlines or community liaison officers) for the public to report issues related to the site, such as safety concerns, noise disturbances, or criminal activities. **Safety Barriers and Signage**: • Use physical barriers, such as cones, bollards, and temporary walkways, to protect the public from hazardous areas, particularly in locations with high pedestrian traffic. • Install proper signage to warn both workers and the public of potential dangers, such as falling objects, open pits, or active machinery.					

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
Issue of the destroyed environment like access roads, temporary material storage and personnel office area which will serve as material storage, debris of materials, unused pits, etc.	- The site rehabilitation plan shall be part of CESMP, and the plan shall detail the activities to be undertaken to rehabilitate the damaged environment - The contractor shall prepare Management Strategies Implementation Plans (MSIPs) detailing the sub-plans and implementation timelines as this ESIA shall be the reference document to inform the design. This shall be done and approved by the consultant. - Regular inspection to each tower shall be organized and coordinated by the Environmentalist from the project proponent.	To all towers location	REG-EDCL,	Quarterly basis and at the completion of the project	TBD
OPERATION PHASE					
Animal biodiversity	• To undertake regular monitoring of threatened species(birds, monkeys) of the area during operation of line. • For bird strikes and electrocutions design the alignments to avoid flyways, migration routes, and areas such as wetlands where birds and bats susceptible to this impact are likely to be present and installation of bird warning devices or diverters on the lines in those areas	• In forest areas and swamplands	REG/EDCL in collaboration with REMA and RFA	REMA; RFA • Self-monitoring byREG	10,000
Risk of bird or bats collisions and electrocutions	• Using **insulated conductors and bird-safe tower designs** to reduce electrocution risks. • Installing **bird diverters or marker spheres** on selected spans near minor wetlands or open water bodies, if any are encountered during construction. • Implementing **nighttime work restrictions** where bat activity is noted. • Conducting **periodic monitoring** to detect any unanticipated impacts on	• Wetlands or where a TL can cross a bird migration	REG/EDCL/Contractor REMA	EDCL PIU	*30,000*

Official Use Only

Impact	Suggested Mitigation Measures	Location	Responsible	Monitoring	Estimated cost (USD)
	avifauna and bats.	route of major flyways.			
Vegetation control	• The ROW will require regular maintenance to control vegetation of the ROW under conductors and in substations • Maintenance operations will have to be restricted to the ROW and should not damage the surrounding vegetation. • During maintenance and ROW clearance, ensure that vegetation is cut up to a certain height that allows animals to cross on both sides. Leave in place the shrub layer • The manual or mechanical control of vegetation within the ROW must be encouraged. To undertake tree removal mechanically and not to use phytocides to control vegetation. • To sign a maintenance contract with a local association/cooperative in order to ensure mechanical	• In all the ROW and substations	• Project implementation Unit (PIU)	• REMA; • Self-monitoring by REG/EDCL	As part of the Operation and maintenance costs
Total Costs					**401,000**

The potential interactions between the Project and the resources and receptors **Error! Reference source not found.** *Figure 12: Interactions of potential sources of impact and potential receptors*

Official Use Only

The matrix displays generic Project activities (through entire life cycle) against resources/receptors in support of a preliminary identification of the potential interactions each activity may have on the range of resources/receptors.

This exercise allowed the preliminary identification of potential interactions between Project activities and resources/receptors to develop generic conclusions as to the interactions likely to lead to significant effects.

This exercise is to be performed on case-by-case basis for each for each sub-component as part of the environmental and social impact assessment to allow identification of interactions leading to significant effects in each particular sub-component case.

The exercise performed indicated that while potential impacts would be expected for all Project phases, Project activities during the construction phase are typically expected to cause the majority of potential impacts. It also indicated that implementation of adequate mitigation strategy in line with the approach set forth in this ESIA may result in a number of **Positive Impacts** as discussed in this ESIA

A color code was used to display the results of the performed analysis of Project activities - receptors interactions as indicated in the legend embedded in the matrix.

7.4.11. Impacts Characterization

At this stage, the characteristics of each impact are to be defined. Typical characteristics to be taken into account are:

- Type (i.e. direct, indirect, induced);
- Extent (i.e. local, regional or international);
- Duration (i.e. temporary, short-term, long-term or permanent);
- Scale or size (no fixed designations; typically numerical values e.g. affected area in ha, etc.);
- Frequency (no fixed designations; typically numerical values e.g. number of occurrences in a given timeframe); and
- Likelihood – only applicable in the case of unplanned events (i.e. unlikely, possible, likely).

7.4.12. Impacts Magnitude Designation

At this stage, the above-indicated characteristics are to be used to assign a magnitude to each sub-component's impact.
In essence, the magnitude defines the degree of change a given impact is likely to affect a resource/receptor. It is important that the magnitude designation is assigned in consistent manner across all considered impacts using same designations. Typical magnitude designations considered in the ESIA practice are:

- Negligible;
- Small;
- Medium;
- Large.

Given the diverse range of impacts to be considered and the variable relevance of potential impacts on the various resources and receptors, applied magnitude designation may include quantitative, semi-quantitative and qualitative methods applied on a case-by-case basis for each environmental and social aspect considered.

Quantitative methods can be applied when the effects can be expressed or measured in a numerical manner. Qualitative approaches require subjective description and typically require an increased professional judgement level as compared to the quantitative approaches.

7.4.13. Resources and Receptors Sensitivity/Vulnerability/Importance Definition

In addition to characterising impacts' magnitude, the definition of the sensitivity/vulnerability/importance of the impacted resource/receptor is the other principal stage in assessing the significance of impacts.

As impacted resources/receptors may be of different nature (e.g. physical, biological, cultural, human) there are various factors to be considered when defining the sensitivity/vulnerability/importance.

Such factors may include quality, sensitivity to change (e.g. for physical receptors like air or water), importance (e.g. local, regional, national, international in the case of a habitat or water body, or a cultural heritage value etc.), vulnerability (e.g. in the case of human or biological receptors etc.).

As in the case of magnitude it is important that sensitivity/vulnerability/importance designation is assigned in consistent manner across all considered impacts using same designations e.g.:

- Low;
- Medium;
- High.

7.4.14. Project Impact Rating

To enhance clarity on the relative importance of identified environmental and social impacts, this ESIA applies a structured impact rating approach that combines the sensitivity/vulnerability of receptors with the magnitude of project-related changes to determine overall impact significance. Each impact is rated prior to mitigation and re-evaluated after the application of proposed mitigation measures, allowing prioritization of high-risk issues and guiding the allocation of management, monitoring, and resources during project implementation.
Each impact in Table 20 is also scored with the method of Sections 6.4.3 and 6.4.4. The scores before and after mitigation are given in the added columns, written as the four consequence components (M, E, D, R), the consequence C, the probability P and the significance S = C x P. The rating in the significance columns follows the correspondence between Table 22 and Table 15 given in Section 6.4.4. Mitigation is reflected mainly in a lower probability and, where relevant, a lower magnitude or a shorter duration.
Table 20: project impact rating table

Official Use Only

Impact	Phase	Receptor Sensitivity	Magnitude of Impact	Impact Significance (Before Mitigation)	Score before mitigation	Key Mitigation Measures	Residual Impact (After Mitigation)	Score after mitigation
Labor influx (specialist workers) & pressure on local services	Construction	High	Medium	Moderate	M3 + E2 + D2 + R3 = C 10; P 4; S = 40	Local recruitment, Code of Conduct, worker induction, collaboration with local authorities, no worker camps (contingency rules apply to specialist workers only)	Minor	M2 + E2 + D2 + R1 = C 7; P 3; S = 21
GBV/SEA risks	Construction	High	Medium	Major	M5 + E2 + D5 + R5 = C 17; P 4; S = 68	GBV Action Plan, worker CoC, awareness for communities, confidential GRM, partnerships with NGOs	Moderate	M5 + E2 + D5 + R5 = C 17; P 3; S = 51
Child and forced labour	Construction	High	Small	Moderate	M5 + E2 + D5 + R5 = C 17; P 3; S = 51	Age verification, labor audits, contract clauses, inspections, community sensitization	Minor	M5 + E2 + D5 + R5 = C 17; P 2; S = 34
Social conflict & crime	Construction	Medium	Medium	Moderate	M3 + E2 + D2 + R3 = C 10; P 4; S = 40	Local recruitment, security coordination, community liaison, grievance mechanism	Minor	M2 + E2 + D2 + R1 = C 7; P 3; S = 21
Noise and vibration	Construction	Medium	Small	Minor	M2 + E1 + D1 + R1 = C 5; P 5; S = 25	Daytime work, equipment maintenance, noise limits	Negligible	M1 + E1 + D1 + R1 = C 4; P 4; S = 16
Loss of vegetation	Construction	Medium	Medium	Major	M3 + E3 + D5 + R3 = C 14; P 5; S = 70	Restricted ROW clearing, rehabilitation, replanting	Minor	M2 + E2 + D3 + R1 = C 8; P 4; S = 32
Soil erosion	Construction	Medium	Medium	Moderate	M3 + E2 + D2 + R3 = C 10; P 4; S = 40	Erosion control, topsoil storage, rehabilitation	Minor	M2 + E2 + D2 + R1 = C 7; P 3; S = 21
Water pollution	Construction	High	Small	Moderate	M3 + E2 + D2 + R3 = C 10; P 4; S = 40	Spill control, zero liquid discharge, wastewater management	Minor	M2 + E2 + D2 + R1 = C 7; P 3; S = 21
Occupational health & safety risks	Construction	High	Medium	Major	M5 + E2 + D5 + R5 = C 17; P 4; S = 68	OHS Plan, PPE, toolbox talks, safety audits	Moderate	M5 + E2 + D5 + R5 = C 17; P 3; S = 51
Visual impacts	Construction	Low	Small	Minor	M2 + E2 + D2 + R1 = C 7; P 5; S = 35	Camouflage painting, vegetation buffers	Negligible	M1 + E2 + D2 + R1 = C 6; P 3; S = 18
Bird collision/electrocution	Operation	Medium	Medium	Moderate	M3 + E2 + D5 + R3 = C 13; P 4; S = 52	Bird diverters, insulated conductors, monitoring	Minor	M2 + E2 + D5 + R3 = C 12; P 2; S = 24

7.4.15. Evaluation of Impacts Significance

Once the magnitude of the impact and sensitivity/vulnerability/importance of the resource/receptor have been characterized, the impact significance shall be assigned for each impact.

The significance is typically designated with the consideration of the above indicated two factors,

Official Use Only

typically using an evaluation matrix similar to the one provided for exemplification purposes in below:

Table 21: Impact Significance Designation Matrix Example

Sensitivity / Vulnerability	Negligible	Small	Medium	Large
Low	Negligible	Minor	Moderate	Moderate
Medium	Negligible	Minor	Moderate	Major
High	Negligible	Moderate	Major	Major

Source: ESIA, 2025.

Again, it is important that the employed significance designation is consistently applied to all considered resources/receptors, and all impacts to these resources/receptors.

Further, the above significance ratings are to be defined based on clear definitions indicating how these should be assigned. A possible set of such impact significance ratings to apply is provided below.

Table 22: Impact significance rating example

Significance Rating	Description
Negligible	Impact is of negligible significance if the resource/receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.
Minor	Impact is of minor significance if the resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small (with or without mitigation) and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.
Moderate	Impact is of moderate significance if its magnitude is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a regulatory limit.
Major	Impact is of major significance if an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors.

Source: ESIA, 2025

Tables 21 and 22 are generic examples of how a significance matrix and rating descriptions can be set out. The project's own ratings in Tables 18 and 20 are calculated with the scoring method in Section 6.4.4 and classified with Table 15.

7.5. Description of environmental effects of mitigation measures

1. Land Use and Vegetation Management
   - **Environmental Effects**:
     - **Positive**: Targeted clearance helps preserve sensitive ecosystems and biodiversity hotspots. Restoring vegetation after construction can rehabilitate the environment and encourage ecosystem recovery.
     - **Negative**: Even with controlled clearing, some vegetation loss and habitat fragmentation may occur, which can lead to a reduction in biodiversity. Clearing vegetation may also contribute to soil erosion, particularly in areas with steep slopes, unless proper soil stabilization techniques are implemented.
   - **Mitigation Measure**: Clearing vegetation along the transmission line's right-of-way (RoW) and avoiding sensitive areas (such as forests, wetlands, and wildlife habitats) to minimize ecosystem disruption.
2. Soil and Erosion Control
   - **Environmental Effects**:
     - **Positive**: Proper erosion control measures can prevent sediment runoff into nearby water bodies, protecting aquatic ecosystems and preserving soil fertility in agricultural areas. Re-vegetation after construction can restore soil stability and minimize long-term environmental degradation.
     - **Negative**: Temporary disturbances during the construction phase, such as heavy machinery operation, can cause soil compaction and localized erosion. If erosion control measures are not well-maintained, they can fail and lead to sedimentation in rivers and wetlands.
   - **Mitigation Measure**: Employing erosion control methods, such as silt fences, erosion mats, and replanting disturbed areas, to prevent soil degradation.
3. Water Resource Protection
   - **Environmental Effects**:
     - **Positive**: Buffer zones and proper drainage reduce the risk of polluting water sources. Avoiding sensitive areas like wetlands helps preserve aquatic habitats and maintain the natural flow of water bodies.
     - **Negative**: Drainage channels or altered water courses can sometimes change natural water flow patterns, potentially impacting downstream ecosystems. Construction near water bodies, even with precautions, can lead to accidental spills or increased sedimentation that affect aquatic life.
   - **Mitigation Measure**: Buffer zones near rivers and wetlands, careful planning to avoid water body crossings, and ensuring proper drainage systems are in place to prevent water contamination.
4. Wildlife and Habitat Protection
   - **Environmental Effects**:
     - **Positive**: Protecting critical wildlife habitats and migration paths reduces the risk of disturbing or displacing animal species. Habitat-sensitive construction techniques, such as using existing road networks or avoiding deforestation, help maintain biodiversity.
     - **Negative**: Fragmentation of habitats may still occur, particularly if the transmission

Official Use Only

line crosses areas used by wide-ranging species. The construction noise and human presence could disrupt local wildlife temporarily, potentially leading to behavioral changes or displacement.

- **Mitigation Measure**: Design the transmission line route to avoid wildlife migration corridors, protected areas, and minimize tree felling in forested regions.

5. **Avifauna and bats**
    - **Negative Impacts:** Collisions and electrocutions**.** Bats are vulnerable due to their flight patterns and echolocation behavior, which can be disrupted by overhead infrastructure.
- **Mitigation:** Careful route selection and the implementation of bird-safe and bat-friendly line designs (e.g., bird diverters). 5. Air Quality Control

6. Dust reduction

- **Environmental Effects**:
    - **Positive**: Dust control reduces particulate matter in the air, which can benefit both the local community and nearby ecosystems. Lower emissions from equipment reduce air pollution, limiting impacts on human health and contributing to better overall air quality.
    - **Negative**: Increased water use for dust suppression may strain local water resources, particularly during dry periods. Emissions from construction equipment, even with mitigation, can still contribute to localized air pollution, affecting both the environment and nearby residents.
- **Mitigation Measure**: Using dust suppression techniques (e.g., water spraying on dirt roads) and ensuring that construction vehicles meet emission standards to reduce air pollution.

6. Noise and Vibration Reduction

- **Environmental Effects**:
    - **Positive**: Reducing noise pollution during construction can minimize its impact on local fauna, particularly sensitive species such as birds and mammals that rely on sound for communication and navigation. It also limits disturbances to local residents, improving community relations.
    - **Negative**: Despite mitigation, temporary increases in noise and vibrations may still occur, potentially disrupting wildlife, especially in protected areas or habitats near the construction zone.
- **Mitigation Measure**: Limiting construction activities to certain hours and using noise-dampening equipment to minimize disturbances to nearby communities and wildlife.

7. Waste Management

- **Environmental Effects**:
    - **Positive**: Proper waste management reduces the risk of contamination of soil and water, protecting the environment and human health. Recycling and reusing materials help reduce the environmental footprint of the project.
    - **Negative**: Mismanagement of waste, particularly hazardous materials (e.g., oils, chemicals), could lead to contamination of soil and water sources, affecting wildlife and human communities. In some cases, waste disposal activities may still generate pollution, such as greenhouse gas emissions from transportation to recycling or disposal sites.
- **Mitigation Measure**: Implementing proper waste disposal practices, including recycling

Official Use Only

construction materials and handling hazardous waste in accordance with environmental regulations.

8. Socio-Economic and Community Impact
   - **Environmental Effects**:
     - **Positive**: Community engagement can improve local understanding of the project, reducing resistance and fostering cooperation. Employment opportunities and fair compensation for land take can improve local livelihoods, reducing economic pressures on surrounding natural resources (e.g., illegal logging or over-harvesting).
     - **Negative**: Most of the workforce will be recruited locally, so any influx of temporary workers will be limited to specialist staff. These workers can still increase demand for local resources (water, food, and fuel), potentially straining local ecosystems. There may also be indirect environmental impacts from increased human activity in previously undisturbed areas.
   - **Mitigation Measure**: Engaging local communities, ensuring fair compensation for land take, and promoting job creation during the construction phase.
9. Transmission Line Corridor Maintenance
   - **Environmental Effects**:
     - **Positive**: Regular monitoring and maintenance can prevent future environmental degradation, ensuring the continued safety and sustainability of the transmission line. Controlled vegetation management can maintain the balance between operational safety and environmental protection.
     - **Negative**: Ongoing vegetation management (e.g., trimming or herbicide use) can lead to habitat degradation or the introduction of invasive species. Herbicides, if not properly managed, may have toxic effects on non-target species and contaminate water sources.
   - **Mitigation Measure**: Regular maintenance of the transmission line corridor, including controlled vegetation management to prevent tree encroachment.
10. **Mitigation for GBV/SEA (Codes of Conduct, Awareness Campaigns, GRM)**

While GBV/SEA prevention measures are essential, their implementation may generate secondary social risks if not carefully managed. The following measures will therefore be applied to address such risks:

- **Risk of stigma or retaliation against survivors**
  Mitigation: All complaints will be handled through a confidential, survivor-centered Grievance Redress Mechanism (GRM) with restricted access to case information. Reporting channels will allow anonymous submissions, and no identifying information will be disclosed without informed consent. Referral pathways will be established with qualified local service providers to ensure psychosocial, medical, and legal support. Community sensitization will emphasize zero tolerance for retaliation.
- **Superficial compliance with Codes of Conduct (CoC)**
  Mitigation: Compliance will go beyond training attendance. Contractors will integrate CoC obligations into employment contracts, link violations to enforceable disciplinary measures, and conduct periodic refresher trainings. Independent monitoring by the PIU Social Specialist and reporting to Rwanda Energy Group will ensure accountability.
- **Tension arising from new reporting mechanisms**
  Mitigation: Prior to rollout, community engagement sessions will explain the purpose, scope,

and confidentiality of the GRM. Local leaders will be oriented on procedures to avoid misinformation. Continuous dialogue will be maintained to ensure the system builds trust rather than conflict.

With these measures in place, the residual risk associated with GBV/SEA mitigation implementation is expected to be **Minor**.

11. Mitigation for Disease Transmission (Health Screening, Awareness, Sanitation)

Disease prevention measures will be implemented in a non-discriminatory and environmentally responsible manner:

- **Risk of discrimination from health screening**
  Mitigation: Health screening will follow national labor and public health guidelines and will not be used to unjustly exclude workers. Confidentiality of medical data will be strictly maintained. Workers testing positive for communicable diseases will be referred to appropriate health services and supported according to national protocols rather than automatically dismissed.
- **Risk of improper medical waste disposal:**
  Mitigation: Any medical or sanitation waste (e.g., PPE, testing materials) will be managed in accordance with Rwanda biomedical waste management regulations. Licensed waste handlers will be used where required, and disposal practices will be supervised by the Environmental Officer to prevent soil or water contamination.
- **Risk of "message fatigue":**
  Mitigation: Awareness campaigns will be strategically scheduled and integrated into broader community engagement activities to avoid repetition. Messaging will be clear, culturally appropriate, and periodically adapted to maintain relevance and effectiveness.

With these safeguards, disease prevention measures are expected to result in **negligible secondary impacts.**

12. Mitigation of Child and Forced Labor (Audits, Age Verification, Reporting Systems)

Enforcement of labor standards will be complemented by social risk management measures:

- **Risk of loss of informal income for vulnerable families:**
  Mitigation: Enforcement of minimum age requirements will be accompanied by community sensitization on child protection laws and long-term benefits of education. Where vulnerable households are identified, they will be referred to existing government social protection programs to reduce economic pressure that could push children into hidden labor.
- **Risk of community resentment:**
  Mitigation: Engagement with local leaders and households will clarify that child labor prohibition is a legal requirement aligned with national legislation and international labor standards. Transparent communication will reduce misunderstanding and resistance.
- **Privacy concerns or contractor resistance to monitoring:**
  Mitigation: Labor audits will follow clear procedures respecting confidentiality of personal data. Contractors will be informed of monitoring obligations at contract signing stage, and compliance will form part of contractual performance evaluation.

Through these complementary measures, enforcement actions will not only prevent child and forced labor but also minimize unintended social tensions. Residual impact is assessed as **Minor**.

13. Community Health and Safety

Potential risks include increased traffic hazards, exposure to hazardous materials, accidents around construction sites, and noise and dust pollution, which may impact vulnerable groups like children,

Official Use Only

the elderly, and people with respiratory conditions.

- **Traffic Hazards**

During construction, the movement of heavy trucks and machinery increases the likelihood of road accidents, especially along narrow or poorly maintained local roads. The presence of construction vehicles may obstruct normal traffic flow and reduce visibility, increasing the risk of collisions.
To mitigate these hazards, contractors should develop and implement a Traffic Management Plan (TMP) in coordination with local authorities. This should include clearly marked detours, signage, speed limits, and the deployment of trained traffic marshals. Community awareness sessions and road safety campaigns should also be conducted to enhance local understanding of the risks.

- **Construction Site Risks**

Open excavation areas, high-voltage equipment, and moving machinery on construction sites pose direct physical risks to nearby community members, particularly curious children. Poorly secured construction zones may lead to accidental entry, injuries, or exposure to hazardous materials.
To address these risks, all construction zones should be securely fenced, clearly marked with warning signs, and access restricted to authorized personnel only. Contractors must also ensure that all hazardous materials are stored and disposed of in compliance with safety standards.

- **Positive Environmental Impacts**

Despite potential risks, construction activities can bring positive environmental and health-related outcomes if managed well. For instance, upgraded access roads may improve local mobility and access to health and social services. Temporary employment opportunities and health awareness campaigns initiated during the project can also contribute to better hygiene practices and increased health literacy in host communities.

- **Negative Environmental and Social Impacts**

On the other hand, improper handling of construction activities may result in negative environmental impacts, such as dust emissions, noise pollution, oil or fuel spills, and improper waste disposal, which can affect local air and water quality. These conditions can exacerbate existing health issues or trigger new ones in the community. To **mitigate** these effects, contractors must adopt environmental control measures, including dust suppression (e.g., water spraying), noise barriers, proper solid and liquid waste management, and regular environmental monitoring.

7.6. Grievance Redress Mechanism

7.6.1. Introduction

Articles 33 and 34 of the Expropriation Law No 32/2015 of 11/06/2015 provide complaints procedures for individuals dissatisfied with the value of their compensation. Article 33 of the Expropriation Law stipulates that dissatisfied persons have a period of 10 days from the application for counter valuation by the person to be expropriated. This application should be done within 7 days after the approval of the valuation report by the expropriator.

7.6.2. Common likely types of grievances and disputes

In practice, grievances and disputes that are most likely during the implementation of a resettlement program are the following:

- Misidentification of assets or mistakes in valuing them
- Disputes over plot limits, either between the affected person and the Project, or between two neighbors;

- Dispute over the ownership of a given asset (two individuals claim to be the owner of this asset); e.g. due to recent change of asset ownership
- Disagreement over the valuation of a plot or other asset; and
- Successions, divorces, and other family issues, resulting in disputes between heirs and other family members, over ownership or ownership shares for a given asset.
- Lack of transparency in recruitment processes.
- Favoritism or exclusion in local hiring.
- Poor working conditions or wage disputes for local laborers.
- Excessive dust, noise, or vibration affecting homes and schools.
- Improper waste disposal near communities or farms.
- Water pollution or siltation affecting streams and irrigation.
- Concerns about increased traffic and risk of accidents.
- Unsafe construction zones posing risks to children or vulnerable people.
- Incidents of GBV/SEA involving project workers.
- Harassment or inappropriate behavior by staff or contractors.

7.6.3. Grievance Redress Mechanism

7.6.3.1. Overview

The experience has shown that many grievances derive from misunderstandings of the Project Policy, or result from neighbor conflicts, which can usually be solved through adequate mediation using customary rules. Most grievances can be settled with additional explanation efforts and some mediation using customary disputes settlement mechanisms:

- Through explanations (for instance explain in detail how the Project calculated the complainant's compensation and that the same rules apply to all); or
- Through arbitration, resorting to elders or individuals well regarded by the community and external to it.

In contrast, resorting to the judicial system often results in long delays before a case is processed, may result in significant expenses to the complainant, and requires a complex mechanism, involving experts and lawyers, which can fall well beyond the complainant's control, and be counterproductive to him/her. Also, courts may declare themselves not competent for matters related to informally owned property. Therefore, the Project will put in place an extra-judicial mechanism for managing grievances and disputes arising from the resettlement process based on explanation and mediation by third parties. Each of the affected persons will be able to trigger this mechanism, while still being able to resort to the judicial system. Procedures relevant to this amicable mechanism are detailed below. It will include three different levels:

- Registration of the complaint, grievance or dispute case by EDCL in collaboration with local authorities;
- Processing of the grievance or dispute until closure is established (within 15 days) based on evidence that acceptable action was taken by EDCL; and
- In the event where the complainant is not satisfied with action taken by EDCL as a result of the complaint, amicable mediation can be triggered involving a mediation committee independent from the Project.

7.6.3.2. Amicable Resolution Mechanism

Complaints that cannot be closed to the complainant's satisfaction will be handed over to a mediation

committee that will include the following individuals: One representative of the local administration; One EDCL representative acting as an observer; Three representatives of the affected people, including at least one woman, chosen from the CNF at Cell level and/or amongst community based organizations, elders, customary authorities; One representative of an NGO or of a religious organization present in the project area.
The main function of the committee would be arbitration and negotiation based on transparent and fair hearing of the cases of the parties in dispute between PAPs and the implementing agencies for local government. The committee gives solutions to grievances related to project activities including compensation and land acquisition, GBV, SEA, Recruitment process, wages and working conditions among others.

7.6.3.3. Processing

After a complaint or dispute has been registered, EDCL will prepare the technical background to the complaint (for instance, the proposed compensation amount, the list of meetings and interviews with the complainant, a description of the exact reason of the dispute, etc.) for consideration by the mediation committee. The complainant(s) will be invited before the mediation committee, which will mediate and attempt to propose a solution acceptable to both parties (EDCL and complainant). If need be, other meetings will be held and the committee may resort to one of its members to arbitrate in a less formal framework than meetings, if appropriate.

If reached, the agreement will be sanctioned by a settlement agreement signed by the parties, and the chair of the mediation committee will be responsible for monitoring the implementation of this agreement, which will include all references to the applicable local law provisions.

Grievance resolution is encouraged to be resolved at Cell level, as they are aware of and involved in the whole process. If the grievance is not resolved in this way, local courts (ABUNZI) should be used. If not resolved, then the high court or court of appeal of Rwanda remains an avenue for voicing and resolving these complaints.

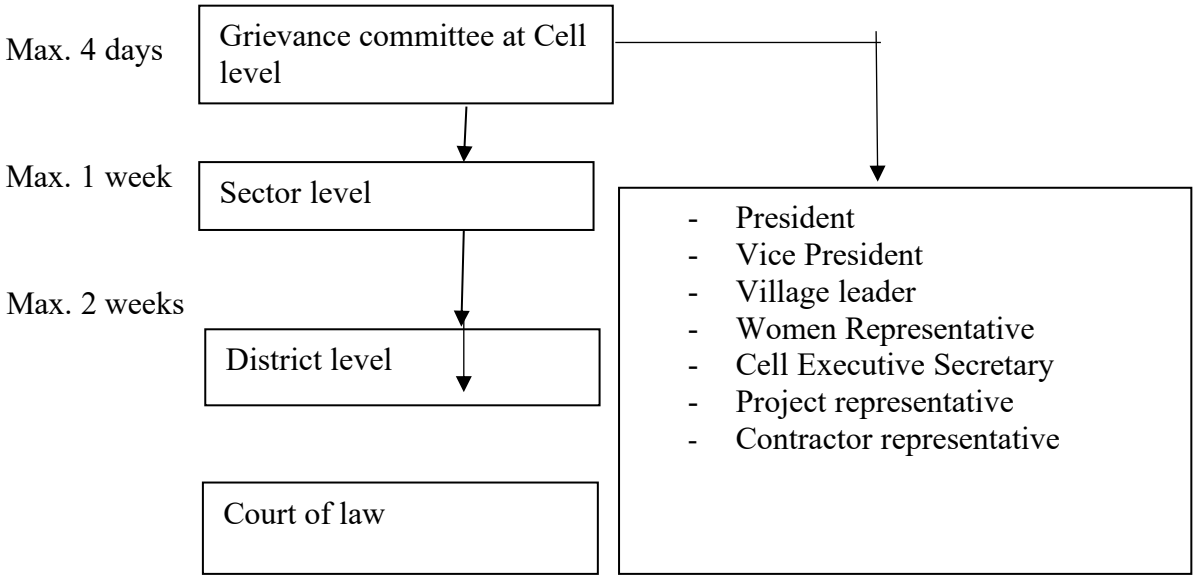
7.6.3.4. Grievance Log

Grievances should be recorded in a log by the EDCL grievance manager. He will record all information of people complaining, nature of complaint, how it was resolved and the timeframe for close-out. The suggested grievance handling procedure can be summarized as follows:

7.6.3.5. Grievance Redress Committee (GRC) and composition

First, all interested stakeholders have developed a Grievance Redress Mechanism (GRM) for potential use. The aim of the grievance redress mechanism is to achieve mutually agreed resolution of grievances raised by such stakeholders. This grievance redress mechanism ensures that complaints and grievances are addressed in good faith and through a transparent and impartial process, but one which is culturally acceptable. As the GRM works within existing legal and cultural frameworks, it will be effectively implemented by a Grievance Redress Committee (GRC), which is organized in such a way that it will comprise local community representative, PAP representative, local authority representative at village and cell levels, EDCL/RUEAP and its safeguards.
As mandated by the law on gender equality, women will make up at least 30% of the GRC. All PAP representatives will be directly elected by their peers and the number of members may vary depending on the context and particularities of each sub-project site characteristics.

Figure 13: Grievance redress process for the implementation of this Project



Source: Consultant own construct, 2025

7.6.4. Description of tasks and day-to-day responsibilities

- Receive unresolved complaints/grievance from RUEAP-EDCL and shall take over;
- The Grievance Redress Committee will log these in the Complaints Register and inform the Project Implementation Unit.
- The Grievance Redress Committee will keep a grievance Logbook and ensure that each complaint has an individual reference number and is appropriately tracked, and recorded actions are completed. The Log will contain record of the person responsible for an individual complaint, and records dates for the following events:
    - Date the complaint was reported.
    - Date the Grievance Log was added onto the project database.
    - Date information on proposed corrective action sent to complainant (if appropriate);
    - The date the complaint was closed out; and
    - Date response was sent to complainant.
- On receipt of the complaint, the GRC at cell level will endeavor to resolve it immediately. In case the GRC at cell level fails to solve the complaint, it will be escalated to the GRC at Sector level. If unsuccessful, the GRC or the complainant then notifies District Officials.
- At each level of the project, GRC will participate in solving complaints within a period of 24-48 hours or otherwise it is escalated and handed to the next level.

7.6.4.1. Response to grievances

Response to grievance will be through the following channels.

- The same channel the complaint was submitted.
- Response to grievances should be handled in timely manner (according to the duration indicated for each tier), thereby conveying a genuine interest in and understanding of the worries put forward by the community.
- EDCL-REG should keep a record of complaints and results.

7.6.4.2. Monitoring of grievances

All grievance activities should be monitored in order to verify the process. The following indicators should guide the monitoring process:

- Number of received grievances per month (Channel, gender, age, basic economic status of the complainants should be included)
- Type of grievance received (according to the topic of the complaint)
- Number of grievances solved.
- Level of satisfaction with grievance resolutions
- Documentation efficiency
- Dissemination of activities done.
- Efficiency of response to grievance provided (efficiency in time and action taken)

A Grievance Monitoring Report should be developed on a semi-annual (6 months) basis to keep track of all grievances developed. The report should be developed by the Safeguards Specialist from RUEAP-EDCL.

All grievances received shall be documented in a grievance register. The following table represents the main contents of such form:

Grievance Form

Serial Number:
Date:
Name:
Gender of the aggrieved person:
Age of the aggrieved person:
Education of the person reporting a grievance:
Topic of grievance:
Actions to be taken (short term- long term):
The referral of grievance:
Monitoring for grievance:

Official Use Only

Chapter VIII: Stakeholder Engagement

8.1. Introduction

Stakeholder engagement is a vital component of the Environmental and Social Impact Assessment (ESIA) process. It ensures that project-affected persons (PAPs), relevant institutions, and other interested parties are adequately informed, consulted, and engaged throughout the project cycle. The process promotes transparency, accountability, and inclusiveness, and provides opportunities for stakeholders to express their views, concerns, and expectations about the proposed Bwishyura–Kigoma Transmission Line (TL) Project.

The consultation and engagement process focused on providing project information in an understandable format to different audiences, receiving feedback, and incorporating relevant inputs into project design and mitigation planning. Effective engagement also helps develop a sense of ownership among stakeholders and ensures that their concerns are considered, particularly in the Resettlement Action Plan (RAP) and Environmental and Social Management Plan (ESMP).

8.2. Consultation Approach

Consultations were conducted at the national, district, and local community levels along the entire project corridor between **14th and 28th August 2023**. Due to COVID-19-related restrictions during that period, classical public meetings could not be held in all sites. Alternative communication methods such as **telephone calls, Skype, and Zoom** were used to ensure the continuity of stakeholder engagement while respecting social distancing measures.

Despite these constraints, the Environmental and Social (E&S) Risk Management Team from **EDCL (Energy Development Corporation Limited)**, in collaboration with local authorities, managed to hold several face-to-face meetings in areas where public gatherings were permitted under health guidelines.

8.3. Identification of Stakeholders

Key stakeholders were identified based on their roles, responsibilities, influence, and potential impact or interest in the project. Initial discussions were held with decision-making bodies, key sector institutions, and community representatives to present the project concept, objectives, and potential benefits. The consultations emphasized public participation, the role of local authorities, and the importance of joint collaboration for the project's success.

8.3.1. National Level Stakeholders

- Ministry of Environment (MoE)
- Ministry of Infrastructure (MININFRA)
- Rwanda Environment Management Authority (REMA)
- Rwanda Standards Board (RSB)
- Rwanda Development Board (RDB)
- Rwanda Land Management and Use Authority (RLMUA)
- Rwanda Utilities Regulatory Authority (RURA)
- Rwanda Water and Forest Authority (RWFA)

8.3.2. Local Level Stakeholders

- District and Sector local government officials
- REG District Branch Managers
- Project Affected Persons (PAPs)

8.3.3. Community Level Stakeholders

- Local leaders (village heads, cell and sector representatives)
- Members of affected and neighboring communities

Consultation and dialogue with PAPs were critical to the successful preparation of the RAP and ESIA. These engagements helped identify the persons likely to be affected by the project and gathered their views on compensation, livelihood restoration, and project benefits.

8.4. Summary of Stakeholder Issues and Concerns

Table 23 below summarizes the main issues raised during consultations in different districts traversed by the proposed transmission line.

Table 23: Summary of concerns and issues raised by the stakeholders during public consultation

Environmental Component	Major Issues and Concerns Expressed
Perceptions and awareness	Most consulted communities were initially unaware of the project. However, they expressed strong support upon understanding its importance, especially for addressing frequent power shortages and promoting rural development.
Land and soil protection	Concerns were raised regarding land fragmentation and disputes, as land ownership is often governed by customary law. Participants emphasized fair and transparent compensation in line with the *Law on Expropriation in the Public Interest No. 32/2015 of 11 June 2015*, and the need for independent valuation to avoid disputes. Communities also feared erosion on steep or marginal lands.
Wetland and water resource protection	Stakeholders highlighted risks of sedimentation and destruction of soil conservation structures (ditches, terraces) resulting from tower construction and access road works. They requested that erosion control measures be integrated and that compensation consider the full extent of household land losses.
Hard-to-reach and steep areas	Communities expressed concern about tower construction in steep or rocky zones due to potential landslides or rockfalls. They suggested minimizing heavy machinery use and establishing early warning systems for downstream households.
Information about the project	Many local authorities and community members were not previously informed about the project. They expressed full support after being briefed and emphasized the need for their involvement in monitoring environmental and social mitigation measures. They also requested priority for local electricity connections where feasible.
Employment opportunities	Authorities and residents requested that local labor be prioritized during construction, especially for unskilled and semi-skilled jobs, to enhance local economic benefits and poverty reduction.
Environmental education	Local leaders appreciated the project's potential to support environmental awareness and education, noting that each district and sector has an environmental officer who could be involved in project monitoring and awareness campaigns.

8.5. Key Outcomes of the Consultation Process

- **Stakeholder awareness** of the project significantly improved, and a general sense of support was observed among consulted communities and authorities.
- **Local authorities pledged collaboration** in project implementation, particularly in facilitating compensation, land access, and community mobilization.
- **Concerns about land disputes and fair compensation** were recorded for integration into the RAP process.
- **Environmental protection and monitoring** were emphasized as local priorities, particularly soil conservation, erosion control, and reforestation around project sites.
- **Commitments to continuous engagement** were established to ensure that consultation remains an ongoing process throughout project planning, construction, and operation.

8.6. Continuous Stakeholder Engagement

The ESIA recognizes stakeholder engagement as a continuous process. EDCL, through its E&S Risk Management Unit, will continue regular dialogue with stakeholders throughout the project lifecycle. Future consultations will:

- Provide updates on project progress and decisions;
- Involve local leaders and PAP representatives in monitoring ESMP and RAP implementation;
- Establish grievance redress mechanisms (GRM) to handle concerns promptly and transparently; and
- Promote inclusive participation, particularly of women, youth, and vulnerable groups.

8.7. Stakeholder Engagement Strategy During Project Implementation

A detailed Stakeholder Engagement Plan (SEP) has been prepared as a standalone document for the ASCENT Project. This ESIA chapter summarizes the key implementation strategy to ensure structured, continuous, and inclusive engagement throughout construction and operation phases.

8.7.1. Objectives of Engagement During Implementation

The stakeholder engagement strategy aims to:

- Ensure timely disclosure of project information;
- Maintain continuous dialogue with affected communities;
- Facilitate RAP and ESMP implementation;
- Prevent and manage social risks (including GBV/SEA, labor issues, and community safety);
- Provide accessible grievance redress mechanisms;
- Strengthen transparency and accountability.

8.7.2. Stakeholder Engagement by Project Phase

(a) Pre-Construction Phase

Key Stakeholders:

- Project Affected Persons (PAPs)
- District and Sector authorities

- Community leaders
- Vulnerable groups (women, elderly, persons with disabilities)

Engagement Activities:

- Disclosure of final ESIA and RAP summaries in Kinyarwanda;
- Community meetings to explain compensation procedures and valuation results;
- Establishment and publicization of the Grievance Redress Mechanism (GRM);
- Targeted meetings with vulnerable households;
- Coordination meetings with district land bureaus and social protection officers.

Frequency: At least monthly until compensation completion.

(b) Construction Phase

Key Stakeholders:

- Host communities along the ROW
- Workers and contractors
- Local authorities
- Police and health centers
- NGOs/service providers (where relevant)

Engagement Activities:

- Community entry meetings prior to works in each sector;
- Public disclosure of construction schedules and traffic management plans;
- Quarterly community feedback meetings;
- Sensitization sessions on GBV/SEA prevention, child protection, and communicable diseases;
- Worker induction sessions on Code of Conduct and community relations;
- Monthly reporting of grievances and resolutions;
- Establishment of community liaison officers at sector level.

Frequency:

- Monthly community updates during active works;
- Immediate engagement in case of incidents or grievances.

(c) Operation Phase

Key Stakeholders:

- Local authorities

- Communities near towers and substations
- Environmental officers
- Regulatory institutions

Engagement Activities:

- Awareness sessions on safety around transmission lines;
- Engagement during maintenance works;
- Disclosure of environmental monitoring results where relevant.

Frequency: as needed during maintenance.

8.7.3. Engagement Methods

Different tools will be used to reach various stakeholder groups:

- Public meetings and barazas
- Focus group discussions (women, youth, vulnerable persons)
- Key informant interviews
- Printed notices and posters
- Radio announcements (where necessary)
- Telephone hotline and suggestion boxes
- Direct engagement through local leaders

All information will be provided in accessible language (Kinyarwanda) and in formats appropriate to vulnerable groups.

8.7.4. Institutional Responsibilities

Stakeholder engagement during implementation will be coordinated by:

- The PIU Social Safeguards Specialist under ASCENT
- EDCL Energy Project Liaison Officer
- Contractor's E&S staff
- District and Sector Authorities

Quarterly stakeholder engagement reports will be prepared and integrated into ESMP monitoring reports.

8.7.5. Grievance Redress Mechanism (GRM)

A structured, multi-tier GRM will be maintained throughout the project lifecycle:

- Community-level grievance committees;
- Sector and district-level escalation;
- PIU-level resolution mechanism;

- Confidential channel for GBV/SEA-related complaints;
- Anonymous reporting options.

8.7.6. Monitoring and Evaluation of Stakeholder Engagement

Stakeholder engagement effectiveness will be monitored using:

- Number of meetings conducted;
- Participation disaggregated by gender and vulnerability;
- Number and type of grievances received and resolved;
- Feedback satisfaction levels;
- Incidents of social conflict or disruption.

Findings will be used to adjust engagement approaches as needed.

Chapter IX: Monitoring Program

This chapter summarizes the environmental and social risk management and monitoring activities proposed in the Environmental and Social Management Plan prepared for this project. It also identifies the roles and responsibilities of stakeholders in the implementation as well as the estimated cost of the activities.

9.1. Environmental and Social Risk Management Specialists

The project promoter is responsible for environmental and social risk management at the construction site. He must ensure that the Contractor implements the Environmental and Social Management Plan, CESMP, traffic management plan and OHS Plan that he prepared and rigorously implements the plans incidental thereto:

- Drainage and erosion control plan;
- Disturbed areas rehabilitation plan;
- Waste management plan;
- Emergency plan in case of spillage of contaminants;
- Fuel and other hazardous materials management plan.

- ✓ That E&S risk management will be undertaken on the basis of:
- ✓ Content of reports drafted in the context of this mandate, especially in regards with guidelines for design, above-mentioned preventive and mitigation measures, as well as environmental management plans.
- ✓ Any additional environmental study that would be required for development of specific projects.
- ✓ Conditions contained in the documents of environmental authorization issued by the state.
- ✓ Environment protection clauses that will have to be integrated in the contract documents.

A site environmental and social officer who will enforce the implementation of various prevention and mitigation measures will have to be appointed by the Contractor. That officer will have to be involved during the entire period of construction. His responsibilities and mandate will have to be subject to a clear description in the contract documents exchanged between the national environment protection agencies and the project Promoter. A Contractor will also have a health and Safety Staff to cater for Workplace Health and Safety hazards.
An alert structure in case of accidental spillage will have to be designed by the Contractorand submitted for approval to the PIU E&S and national environment protection agencies and emergency materials (emergency tool kit) will have to be available on site.

The environmental and social risk management officer will be the main stakeholder in charge of control andimplementation of environmental requirements applicable to the project. Therefore, he or she will:

- ✓ Attend coordination meetings with the Project promoter and the Contractor toassess the environmental compliance of its activities, and, where relevant, define corrective measures.
- ✓ Hold sessions for awareness raising and training for workers employed at the construction

Official Use Only

site. Those sessions will present the main sensitive environmental component, environmental protection measures applicable to works, and the alert structure in case of accidental spillage of pollutants.

- ✓ Enforce the implementation of all mitigation measures and other provisions relating to environment protection, raise any derogation and enforce implementation of required corrective measures.
- ✓ Guide decision making about environmental issues during work progress, even during unforeseen or emergency situations.

The environmental and social risk management should extend during construction phase to quality control by the end of works.

Table 24 below summarizes the activities requiring an increased protection, necessary parameters, measure frequencies and responsibilities.

Official Use Only

Table 24: Parameters of environmental protection at the construction site to be monitored

Environmental / Social Component	Project Phase	Monitoring Parameter / Indicator	Applicable Standard	Location	Monitoring Frequency	Reporting Frequency	Implementation Responsibility	Supervision Responsibility
Water Quality	Construction	pH, EC, TSS, turbidity, NH4+, NO3-, P, Fe, Al, DO, BOD, oil & grease, total coliforms (where applicable)	REMA & World Bank Standards	Material storage areas, equipment yards, nearby water bodies	Monthly	Quarterly	Contractor	PIU Environmental & Social Specialist
Air Quality / Dust	Construction	PM10, PM2.5, TSP, visual dust emissions	REMA & World Bank Standards	Construction sites and access roads	Quarterly	Quarterly	Contractor	PIU Environmental Specialist
Noise Levels (Construction)	Construction	dB(A) levels at equipment yard and sensitive receptors	REMA Standards & World Bank EHSGs	Equipment yard; nearby residences, schools	continuous	Quarterly	Contractor	PIU Environmental Specialist
Soil Erosion & Sedimentation	Construction	Visual inspection of erosion control measures; turbidity (where applicable)	REMA Directives	Tower sites, slopes, borrow areas	quarterly	Quarterly	Contractor	PIU Environmental Specialist
Vegetation Clearing (ROW Compliance)	Construction	Width of clearing vs. approved design; number of trees removed	ESMP	Along ROW and work areas	Continuous supervision	Monthly	Contractor	PIU Environmental Specialist
Rehabilitation of Disturbed Sites	Construction	% of disturbed sites rehabilitated; stabilization of borrow pits	ESMP	Storage yards, borrow areas, tower sites (no worker camps are planned)	Weekly inspections	Monthly	Contractor	PIU Environmental Specialist
Signed Codes of Conduct	Project-wide	Number of cases reported and referred (confidentially)	ESMP & GBV Action Plan	Project-wide	Continuous monitoring	Quarterly	Contractor (Social Officer / CLO)	PIU Social Specialist
Grievance Redress Mechanism (GRM)	All Phases	- Number of grievances received % resolved within 30 days Type of complaints	ESMP	Project-wide	Continuous	Monthly	Contractor & EDCL	PIU Social Specialist
grievance monitoring, GBV, SEA & SH.	Construction	Number and percentage of workers who have signed the Code of Conduct (CoC). Number and percentage of workers trained on GBV/SEA/SH prevention and acceptable behavior standards. Number of refresher trainings conducted and attendance records. Number of GBV/SEA/SH grievances received Time taken to acknowledge and	ESMP	Project-wide	Continuous	Monthly	Contractor & EDCL	PIU Social Specialist

Official Use Only

Environmental / Social Component	Project Phase	Monitoring Parameter / Indicator	Applicable Standard	Location	Monitoring Frequency	Reporting Frequency	Implementation Responsibility	Supervision Responsibility
		refer GBV/SEA/SH cases						
Child & Forced Labor Compliance	Construction	- Age verification records Labor audits conducted Worker grievance cases	National Labor Law & WB ESF	Construction sites	Continuous	Quarterly	Contractor	PIU Social Specialist
Occupational Health & Safety (OHS)	Construction & Operation	- Number & type of incidents LTIFR PPE compliance Toolbox meetings conducted	National OHS Regulations & WB EHSGs	Work sites	Continuous	Monthly	Contractor	Health & Safety Specialist / PIU
Bird & Bat Mortality	Construction & Operation	- Carcass counts Species identification Location mapping	REMA & WB Standards	Along ROW	Quarterly	Quarterly	EDCL & Contractor	PIU Environmental Specialist
Wildlife Disturbance	Construction & Operation	- Presence/absence of key species Habitat disturbance observations Wildlife mortality incidents	REMA & WB Standards	ROW & sensitive habitats	Quarterly	Quarterly	EDCL	PIU Environmental Specialist
Operational Noise & Vibration	Operation	dB levels at sensitive receptors	National Standards & WB EHSGs	Near substations / ROW	Continuously	Monthly	EDCL	PIU Environmental Specialist
Traffic & Road Safety	Construction	- Number of traffic incidents involving project vehicles Compliance with Traffic Management Plan Driver training records Speed control compliance	National Traffic Law & WB EHSGs	Access roads and community roads along ROW	Continuous	Monthly	Contractor	PIU Environmental & Social Specialist
Hazardous Materials & Fuel Storage	Construction	- Condition of fuel storage areas Spill incidents recorded Availability of spill kits Secondary containment compliance	ESMP & National Environmental Regulations	Equipment yards, fuel storage areas	Monthly	Quarterly	Contractor	PIU Environmental Specialist
Waste Management (Solid & Hazardous)	Construction & Operation	- Waste segregation practices Disposal records Evidence of illegal dumping Hazardous waste manifests	ESMP & REMA Regulations	Construction sites, storage yards	Monthly	Quarterly	Contractor	PIU Environmental Specialist
Community Health & Safety (Non-GBV)	Construction	- Number of community complaints related to safety Incidents involving community members Public awareness sessions conducted	WB ESF (ESS4)	Settlements along ROW	Continuous	Quarterly	Contractor	PIU Social Specialist
Compensation Payment Progress	Pre-Construction & Construction	- % compensation paid before civil works Number of pending cases Time taken to resolve disputes	RAP & National Expropriation Law	Affected cells/sectors	Monthly (until completion)	Quarterly	EDCL	PIU Social Specialist
Vulnerable Group Support	Construction	- Number of vulnerable PAPs assisted Type of	RAP & ESMP	Displacement areas	Quarterly	Quarterly	EDCL	PIU Social Specialist

Official Use Only

Environmental / Social Component	Project Phase	Monitoring Parameter / Indicator	Applicable Standard	Location	Monitoring Frequency	Reporting Frequency	Implementation Responsibility	Supervision Responsibility
		assistance provided Follow-up visits conducted						
Vegetation Regrowth Outside ROW	Operation	- Evidence of unauthorized agricultural expansion within ROW Regeneration status outside cleared corridor	ESMP	Along ROW	Annually	Annual	EDCL	PIU Environmental Specialist
EMF Awareness & Complaints	Operation	- Number of EMF-related complaints Awareness sessions conducted Spot EMF measurements (if required)	National Standards & ICNIRP Guidelines	Settlements near ROW	Upon complaint	Annual summary	EDCL	PIU Environmental Specialist
Tower Structural Integrity & Public Safety	Operation	- Routine inspection records Unauthorized access incidents Condition of warning signage	Operation & Maintenance Plan	All tower locations	Bi-annually	Annual	EDCL	PIU Engineer / Environmental Specialist
Chance Finds (Cultural Heritage)	Construction	- Number of chance finds recorded Compliance with Chance Find Procedure	National Heritage Law & WB ESF (ESS8)	Excavation sites	Continuous	Immediate reporting; Quarterly summary	Contractor	PIU Environmental Specialist

Official Use Only

9.2. Environmental monitoring

In the context of the project, monitoring programs that will be developed must highlight the following:

- ✓ Expected impacts on the edge or within protected areas and sensitive areas;
- ✓ Long-term impact (five years) of the presence of lines on avifauna: This activitymay be entrusted to a national NGO committed to bird protection.
- ✓ Modification of erosion and sedimentation phenomena in the ROW and accessroads.
- ✓ Success of rehabilitation of sites disturbed by works. Monitoring after works includes:
    - ✓ Inspections.
    - ✓ Visual observations.
    - ✓ Surveys.
    - ✓ Selection of critical environmental parameters and their regular sampling.

9.3. Institutional/Organizational and Responsibilities in ESMP implementation

This section sets out the institutional and organizational arrangements as well as roles and responsibilities for the implementation of the ESIA/ESMP.

9.3.1. Role of the Project Implementation Unit (PIU)

The PIU shall be responsible for oversight role and the implementation of mitigation measures in this ESMP and general compliance of the project with any permits, licenses and Approval Conditions and related regulations and standards on environment. The Unit will be responsible for ensuring that the project facilities comply with the environmentaland social requirements as shall be detailed in the contract documents as well as withother guiding contractual provisions and documentation.

9.3.2. The Role of REG-EDCL

REG/EDCL will be responsible for the implementation of the Project through contractors. Its Environmental Unit headed by an Environmental Specialist has the basic training and experience in environmental and social issues and can effectively coordinate and provide expert advice to contractors on how to effectively implement the required environmental and social standards (ESSs) under the project. REG will be responsible for contract management in order to ensure that the contractors adhere to their contractual obligations and that they are compliant with the environmental and social standards as spelt out in their contracts. However, to augment the capacity of the Unit, it is proposed that some short-term technical assistance to back this capacity be provided for in the project and should cover technical and equipment as well as some specialized training.

9.3.3. Role of REMA

REMA is specifically mandated by the National Environment law as the principal agency in Rwanda and is charged with the responsibility of monitoring, supervising, and regulating all environmental management matters in the country. One of the key institutional mandates of REMA includes among others ensuring the observance of proper ESSs in the planning and execution of all development projects including those already in existence that have or are likely to have significant impact on the environment. The role of REMA will be to monitor the compliance to this ESIA during project implementation in accordance with the provisions of the law and the respective regulations.From the

Official Use Only

discussions, REMA has adequate technical capacity to monitor the projectactivities through its Department of Environment Monitoring and Compliance in addition to the District Environment Officers in the respective project areas that will be able to report any cases of noncompliance. Overall, REMA is well placed to capture both environmental and social issues either through their mandatory compliance audits or through monitoring reports by the respective District Environment Officers.

9.3.4. District Local Authorities

District and Local Council in project Districts will be vital in implementation of the project in terms of mobilizing political goodwill and sensitizing communities about the project as well as their District Environment Officers who will be taking care of environmental and social aspects of the project at their levels. The DEOs in the respective areas of project implementation will monitor the project to ensure mitigation measures are adequatelyimplemented. The DEOs will also have to review all project environmental and social assessment reports and provide comments during their review to REMA before issuance ofApprovals. The DEOs will also ensure that the project activities are implemented inaccordance with REMA conditions of approval. The DEOs will also attend the monthly site meetings for the project and be able to point out issues and concerns.

9.3.5. The local leaders

The local leaders in the project areas will have a role on matters of helping contractors access land for the project facilities. They will be key in aspects of labour identification and endorsements. The local leaders will support law enforcement agenciesin curbing crime during project implementation.

9.3.6. The Role of the Contractors

Contractors will be responsible for complying with all relevant legislation and adhere to all mitigation measures specified in the ESIA and its ESMP. REG will therefore have to ensureenforcement of mitigation measures which will be enshrined under contractual obligations. The contractors will be obliged to have resources to ensure implementation of environmental and social management obligations in the contract (this ESMP shall be part of the Contract through hiring Environmental and Social Management Specialists to operationalize the environmental and social requirements in the ESMP and supporting documentation).

9.3.7. Role of Supervising Consultants

The Supervising Consultants should have in their teams at least one Environment and Social Management Specialist who will have overall responsibility of ensuring that project implementation process complies with this ESMP, REMA Approval conditions as well as contract provisions, reviewing and approving plans prepared by the contractor, such as CESMP, OHS Plan. The Environmental and Social Management Specialists shall work closely with EDCL Environmental and Social Risk Management team in supervising the contractor. In addition, the contractors will conduct scheduled site supervisions to monitor state of environmental compliance as documented or executed by the Contractors' Environmentalists. The Supervising Consultants will have an obligation to also oversee compliance and observation of health and safety and labor requirements alongside othercross-cutting issues in the project.

9.4. Institutional capacity strengthening

Capacity strengthening of institutions involved in environment management is paramount.
Concerned Districts could be strengthened to develop their capacities in environment management.

Official Use Only

Capacity building will also be given to the contractor's staff as an induction before project activities start, especially on health and safety. The grievance redress committees will be strengthened by giving them enough information on how to manage grievances in the community. Capacity building will be part of the monitoring activities throughout project implementation. The table below shows the detailed capacity building plan.

Table 25: detailed capacity building plan

Training course	Unskilled labor	Skilled labor	Frontline supervisors	Middle management	Senior manager	Drivers	Safety men
Intro to OHS	X	x	X	x	X	x	x
Emergency response	X	x	X	x	X	x	x
Hazards & controls			X	*	*		
Foreman responsibilities			*	x	X		
Managing safely			X	*	*		
Managing rule-breaking				*	*	x	
Fire prevention	*	*	X	x	X		X
First aid	*	*	*	*			
Confined space entry	X	x	X	x	X		
Back safety/ lifting safety	X	x	X	x	*		
PPE	X	x	X	x	X	x	X
Fall protection		*	*	*	*		
Small/ power tools		*	*	*	*		
Hand Safety	X	x	X	x	X	x	X
Scaffold construction			X	x	X		
Forklift operations	X	x	X	x	X		
Hazard recognition	X	x	X	x	X	x	X
Excavation safety			X	*	*		X
Health & hygiene	*	*	X	x	X		X
Environmental awareness	X	x	X	x	X		X
Ladder safety	X	x	X	x	*		*
Excavation safety	X	x	X	x	*		X
Risk assessment		x	X	x	X		*
Hazard registers				x	*		
Lifting operations		x	X	x	*		
Safe use of chemicals	X	x	X	x	*	x	X

Official Use Only

Training course	Unskilled labor	Skilled labor	Frontline supervisors	Middle management	Senior manager	Drivers	Safety men
Accident prevention	X	x	X	x	X	x	X

9.5. Environmental Awareness and Training Plan

Training will be mostly based on environmental laws and regulations in force in thecountry, but also on the best practices in terms of environmental management including:

- ✓ Tree removal.
- ✓ Watercourse and swamp protection.
- ✓ Hazardous material management.
- ✓ Waste management.

Staff in charge with environmental issues in Districts should receive short training in order to strengthen their capacities and help them fulfill their role.

Training on sensitization about awareness of risks associated with construction and operation of the transmission lines will have to be organized, especially during the construction phase of the line.

Those in charge of monitoring and evaluation of mitigation measures will have to receivetraining in those areas.

Employees of this project should receive specific training for accident prevention and hazards precautions and procedures for the safe storage, handling, transport and use of potentially harmful materials that are relevant to each employee's job task and work area.

Training will also be given on emergency response systems and procedures including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, andthe proper response actions for each foreseeable emergency situation.

Daily safety and environment briefings including inspections of personal protective equipment will be conducted by relevant supervisors or shift bosses.

A safety and environmental induction will be carried out for new employees and for any person arriving on site after a break exceeding two weeks or any contractor arriving on site. The safety induction will cover: the use of personal protective devices, dangerous areas, appropriate conduct, emergency response procedures and waste management.

The following should be part of the Environmental Awareness and Training Plan.

Purpose and Scope: All employees will be required to comply with environmental protection procedures and therefore, proper training shall be given to the workers. The training program aims to ensure that project employees:

- ✓ Are aware of the environmental issues associated with the project;
- ✓ Understand their responsibilities with respect to these issues;
- ✓ Are aware of the liability potential if adequate and reasonable (due diligence) measures are not taken to protect the environment;
- ✓ Understand requirements for protection of the environment, best management

Official Use Only

practices and avoidance measures; and

- ✓ Are aware of the relevant regulations and guidelines.

Delivery: Classroom training should preferably be given before they are assigned on construction work; this can coincide with health and safety orientation. Short, follow-up sessions will be delivered on the ground as required. Environmental awareness messagesshall be posted in the field office(s). Indicative environmental awareness principles and topics are shown in Table 26 below.

Table 26: Environmental Awareness Principles and Topics

Topics	Objectives
Erosion and Sediment Control	To educate project personnel on practices that can be implemented to control erosion and maintain good water quality.
Air Quality	That machine operators will be made aware of the potential effect on air quality that their machines can have and how tokeep their equipment in good running order
Dangerous goods Transportation, Storage and Handling	To educate and make all personnel aware of the harmful or dangerous substances present on-site. To educate personnel on the best methods andrequirements for transporting, off-loading, installing facilities and servicing of equipment. The emphasis will be on spill prevention.
Solid Waste Management	To educate and make project personnel aware on thepractices permitted to dispose of wood, food and paper, sewage and special wastes
Spill Prevention	To educate project personnel on spill response proceduresto protect the environment or minimize impacts from spills ofhazardous materials and release of deleterious substances including sedimentation. All personnel will be made aware ofthe Spill Prevention and Emergency Response plan and the location of spill prevention and cleanup equipment.
Safety Equipment	For their own sake, the construction workers should be instructed to observe safety rules. Good protective clothing (working garments), helmets, boots, gloves, etc. should be provided. Regulation must be enforced to ensure that they are worn at all times when working.
Reporting Structure	This part of the course will inform project personnel of who to call if an environmental concern arises. Generally, an employee will inform the Government Agencies as appropriate.

Responsibility:

The Construction team including site manager, safety officer and Environmental Inspector or their designate is responsible for delivering the training to all construction personnel.

9.6. General Emergency Preparedness and Response Measures

The project will establish a structured Emergency Preparedness and Response Plan (EPRP) covering construction and operation phases. The EPRP will address medical emergencies, fires, electrical incidents, floods, extreme weather events, hazardous material spills, and security-related incidents. The plan will define clear roles, communication procedures, evacuation protocols, and coordination mechanisms with external emergency services.

Official Use Only

9.6.1. Coordination with Local Emergency Services

To ensure rapid and effective response to emergencies, the project will establish formal coordination arrangements with relevant local emergency institutions, including:

- Fire Brigade Services
- Nearby Health Centers and District Hospitals
- Local Police Units
- Disaster Management Committees at Sector and District level

A written coordination protocol (or Memorandum of Understanding where applicable) will be established to clarify:

- Emergency contact points and communication channels
- Response time expectations
- Site access procedures
- Responsibilities during joint emergency response
- Information sharing and incident reporting procedures

Emergency contact numbers will be visibly displayed at all work sites and included in worker induction materials.

9.6.2. Emergency Response Structure at Site Level

The Contractor (during construction) and EDCL (during operation) will establish:

- An Emergency Response Team (ERT) at site level;
- A designated Emergency Coordinator;
- Trained First Aid Responders;
- Fire Wardens for each major work area.

Emergency response equipment will include:

- First aid kits at all active work fronts;
- Fire extinguishers (appropriate types for electrical and fuel fires);
- Fire hydrants (where applicable);
- Spill containment kits;
- Emergency alarm systems and clearly marked evacuation routes.

All emergency equipment will be inspected monthly and records maintained.

9.6.3. Training and Simulation Exercises

To ensure preparedness beyond documentation, the project will implement:

- Mandatory induction training for all workers on emergency procedures;
- Annual refresher training on fire safety, first aid, and electrical hazard response;
- Joint simulation exercises (drills) with local fire brigade and health services at least once per year during operation and at least once during peak construction phase;
- Evacuation drills conducted semi-annually at major work sites.

Simulation exercises will test:

- Alarm activation and communication systems;
- Evacuation efficiency;
- Coordination between site personnel and external responders;
- Medical response time;
- Incident documentation and reporting.

After each drill, a lessons-learned review will be conducted and the EPRP updated accordingly.

Official Use Only

9.6.4. Medical Emergency Preparedness

The project will:

- Establish prior arrangements with nearby health centers and district hospitals;
- Maintain transport arrangements for injured personnel (dedicated vehicle or rapid coordination mechanism);
- Ensure at least two trained first-aiders per active work front;
- Provide insurance coverage for all workers;
- Maintain confidential incident reporting and follow-up records.

9.6.5. Fire Preparedness

A Fire Management Plan will include:

- Identification of fire risk areas (fuel storage, workshops, electrical installations);
- Fire extinguisher placement and maintenance schedule;
- Clear evacuation maps displayed at visible locations;
- No-smoking zones in hazardous areas;
- Safe fuel and hazardous material storage procedures;
- Coordination with local fire brigade for inspection visits where possible.

9.6.6. Incident Reporting and Continuous Improvement

All emergencies and near-miss events will be:

- Recorded in an incident register;
- Reported to the PIU within 24 hours for serious incidents;
- Reviewed during monthly safety meetings;
- Included in quarterly E&S monitoring reports.

Emergency response effectiveness will be periodically evaluated, and corrective actions implemented.

9.7. Costs related to ESMP Implementation

9.7.1. Costs related to construction

Costs for environmental management plan are summarized in Table 19, overall, all the measures to be implemented are costed at 221,076,000 Rwandan Francs either 163,099.53 USD, including administration costs at 2% and contingence costs at 10 %.

Official Use Only

Chapter X: Conclusion and Recommendations

10.1. Conclusion

Access to electricity is one of the primary constraints to the Rwanda economy; providingsuch access unlocks economic opportunity. In the context of this project, such opportunitywould most likely be taken up by the service and processing industries, which can then relyon stable electricity to build a business on. The positive impacts from this project will resultin local economic growth along the transport and trading routes in the concerned districts. The rural landscape into which the extension of the national electricity supply isproposed hosts an agro-ecosystem that is largely rural in which continued wetlandencroachment and deforestation pose as threats to ecosystem resilience.

Much of the natural vegetation in the Project Site has been transformed, withinaccessible riparian areas and pockets of remnant forest remaining in places. Theproposed route crosses numerous water streams areas. No wild animals, other than afew Monkeys and bird species were observed on the site, since the land is primarilyused for agriculture. The rural homestead is typically supported by crops grown for ownuse, cash crops and small-scale stock farming. Trading centers provide access tobasic commodities, like food stuff, fuel, materials, as well as provide for a growing service sector. Maize farming, cattle farming, milk production and pig farming, are allstrong components of the rural agro-economy. These activities can become moreproductive and strengthen the local economy, especially if agro-processing facilitiesbecome more established. It is doubtful whether the ordinary rural homestead will beable to afford grid electricity, yet as the economy grows, the affordability matter is likelyto change. Social services, including health facilities, schools and other services, likethe provision of water, will certainly benefit from improved access to reliable electricity. Care should be taken when determining specific pole locations, during the final designstage, to avoid impacts to specific environmental and social features. There is overwhelming support for the project by all stakeholders, yet certain negative social impacts and cautions have also been raised, as well as ways to deal with them as detailed in the Environmental and Social Management Plan (ESMP).

It is necessary to make sure mitigation measures are implemented continuously through on-site monitoring, reporting and intervention. Various social issues raised during stakeholder engagement can be better managed, as detailed in ESMP. The specific negative social impacts related to vulnerable groups, like women and children, require specific attention and exceptional implementation and management.

The next stage of the work lies in the final design of the route and pole positions, being fullycognizant of and planning around impacts to the sensitive environmental and social features identified. Details are provided in the form of a design guideline, to highlight and respond to specific sensitivities along the current route design. The proposed extension of the national grid is a tried and tested method and currently proves the most practical and cost-effective manner to deliver electricity into the rural areas of Rwanda. With growing interest and more cost-effective technology being available, the use of solar power, in cases where it is applicable, will also continue to grow. Through effective implementation ofthe mitigation measures, stipulated in the resulting Environmental and Social Management Plan (ESMP), the probable risks of this project can be managed and mitigated. The project must be implemented within the suggested ESMP guidelines to avoid negative impacts related to gender inequality, gender-based violence, the abuse of children and the exclusion of vulnerable groups. At the final design stage, the priority is the site-specific placement of structures and planning

Official Use Only

around old trees and other significant environmental and social features. Where the route deviates from the road reserve, discussions and negotiations will be held with the affected landowners. Such work is facilitated through the implementation of the Resettlement Action Plan (RAP) process for the proposed project. The impact classification in this report informs on the magnitude of the impacts that can happen and where more intervention is needed. The red and yellow-colored parameters should serve as a basis of serious intervention.

10.2. Recommendations

Based on the nature of the project activities, biophysical conditions of the project area and the potential negative impacts, it is imperative that the following be given serious consideration and attention in order to preserve the environment and social:

- ✓ Environmental monitoring programs for this project should be implemented to address all activities that have been identified to have potentially significant impacts on the environment, during construction, operation and decommissioning phases.
- ✓ Speedy and appropriate actions must be taken on any issues arisingthrough the monitoring results.
- ✓ Occupational health and safety performance should be evaluated against national and/or international standards.
- ✓ The developer should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities.
- ✓ The working environment should be monitored for occupational hazards relevant to this project.
- ✓ The developer of this project is recommended to implement the environmental and social management plan proposed in this report, that will ensure environmental and social compliance of the operations and also to maintain high quality standards.
- ✓ REG/EDCL is recommended to take into consideration issues and concerns raised during public consultation especially issues related to compensation and job opportunities.
- ✓ REG/EDCL is recommended to consider the expropriation law in public interest by complying with the land acquisition and compensation process.
- ✓ REG/EDCL needs to implement the prepared Resettlement Action Plan (RAP) for the sub-project by assisting the Project Affected Persons in grievances.

Official Use Only

REFERENCES

1. 7 Year Government Program: National Strategy for Transformation (NST1) 2017 – 2024; Final, September 2017, Republic of Rwanda, Kigali.
2. Energy Sector Strategic Plan 2018/19 – 2023/24; September 2018; Republic of Rwanda, Ministry of Infrastructure, Kigali.
3. National Environment and Climate Change Policy, Final, 2019, Republic of Rwanda, Ministry of Environment. Kigali
4. Rural Electrification Strategy, June 2016, Republic of Rwanda, Ministry of Infrastructure. Kigali.
5. Rwanda Energy Group Strategic Plan 2019 – 2024, Final, Kigali.
6. Rwanda Energy Sector Review and Action Plan, 2013, African Development Bank.
7. Rwanda State of Environment and Outlook Report 2015, Republic of Rwanda, Rwanda Environmental Management Authority, Kigali
8. Rwanda State of Environment and Outlook Report 2017, Republic of Rwanda, Rwanda Environmental Management Authority, Kigali
9. BART, F. 1993. Montagnes d'Afrique; Terres paysannes. Le cas du Rwanda. CEGET-CNRS, PUB (Espaces tropicaux n° 7). 588 p.
10. BESSE, F., 1989.- Pour une flore usuelle du Burundi: Données phénologiques et pratiques. Projet Reboisement Banque mondiale-fonds d'Aide et de Coopération, 79 pp.
11. BIRDLIFE INTERNATIONAL, 2008 BirdLife's online World Bird Database: the site for bird conservation. Version 2.1. Cambridge, UK: BirdLife International. Available: http://www.birdlife.org (accessed 15/4/2009).
12. BIZIMANA, Ignace, 1990. Les sols des vallées du Rwanda: leurs propriétés morphologiques et physico- chimiques.
13. BUNEP, 1986. Étude pour le développement de la pêche et de l'empoisonnement des lacs du Nord et de l'Est du Rwanda, Rapport définitif, Étude bibliographique, Phase 1. Kigali.
14. CALIFORNIA ENERGY COMMISSION, 2002. A Roadmap for PIER Research on Avian Collisions with Power Lines in California. Commission Staff Report. Public Interest Energy Research.
15. Center for Geographic Information System (CGIS), 2006. Les couches de base pour les limites administrative, les routes, les cours d'eaux, les lacs et le relief etc.
16. CITES, 1995. Conservation on International Trade in Endangered Species of Wild fauna and Flora. COMITÉ NATIONAL AVIFAUNE, novembre 2006. Oiseaux et lignes électriques in Bulletin du Comité national avifaune. n°3 - novembre 2006.
17. CONSEIL DE L'EUROPE, 2003. Projet de recommandation sur l'atténuation des nuisances des installations aériennes de transport d'électricité (lignes électriques) pour les oiseaux. Convention relative à la conservation de la vie sauvage et du milieu naturel de l'Europe. Document établi par Birdlife International et revu par la Direction de la Culture et du Patrimoine culturel et naturel. 5 p.
18. CONSEIL DE L'EUROPE, n.d. Lignes à haute tension: comment protéger les oiseaux. Sauvegarde de la nature, no 140.
19. DE VOS, Luc, 1986. Étude pour le développement de la pêche et de l'empoissonnement des Lacs du Nord et de l'Est du Rwanda. « Contribution à la connaissance de l'ichthyofaune du Rwanda: Chef de détermination des espèces des lacs Bulera et Ruhondo et des dépressions du Ruhango et de l'Akagera ». Rapport pour I.N.R.S., BUNEP et MINAGRI. 1986.

Official Use Only

20. Experco des Grands Lacs, 2003. Etudes relatives à la protection intégrée et conservation des ressources naturelles des zones humides critiques du Rwanda. Évaluation de la diversité biologique. Kigali. 150 pp.
21. Fischer, E. & Hinkel, H., 1992. La nature du Rwanda. Ministère de l'intérieur et des sports, Rhénanie Palatinat, R.F.A. Université J. Guttenberg, Mayence et Institut de recherche Scientifique et technologique (IRST), Butare.
22. FISHPOOL, L.D.C. & EVANS, M.I., 2001. Important Bird Areas in Africa and Associated Islands: Priorities Sites for Conservation. Newbury and Cambridge, UK: Pisces Publications and Birdlife International (BirdLife Conservation Series No. 11, 703-711 pp.
23. GAUGRIS, Y., 1983. - Liste des oiseaux du Parc national de la Ruvubu. Rapp. inéd.
24. GILON, Y., 1983. – The fire problem in tropical savannas. In: F. Bourlière. The Tropical savannas. Amsterdam, Elsevier, Ecosystems of the world: 617-641.
25. GSCHWENG, M. et al.,2008.- All across Africa: highly individual migration routes of Eleonora's falcon Proc. R. Soc. B doi:10.1098/rspb.2008.0575 Published online.
26. HECK, Nikki, September 2005. Bird Collisions with Electric Power Transmission Lines: Frequently AskedQuestions (FAQs). ALTALINK. 5 p.
27. IUCN, 1997. The 1997 IUCN Red List of Threatened Species. IUCN, Gland. IUCN, 2008. IUCN Red List of Threatened Species. <www.iucnredlist.org>.
28. LEBEL, Jean Paul, 2005. La liste des espèces d'oiseaux inventoriés dans le marais de la Nyabarongo. MINAGRI, 2005. Plan stratégique de transformation agricole au Rwanda. Kigali, 210 p.
29. MININFRA, 2006. Synthèse des données des stations météorologiques du Rwanda, Kigali, 38 pp.
30. MURERE REHE, Sabin, juin 2000. Etat des ressources forestières au Rwanda. EC/FAO ACP Collecte de données - Rapport Technique AFDCA/TR/14. 59 p.
31. NSENGIYUMVA, R., 2006. - Etat des lieux du bassin de l'Akagera. Rapport de mission, FAO, 35 pp.
32. PRATT, DJ. et M.D. GWYNNE, éds 1977. - Range-land Management and Ecology in East Africa (Gestion des terres de parcours et écologie en Afrique de l'Est). Hodder et Stoughton, London, 310 pp.
33. PRIOUL. G, SIRVIREN, P. et al., 1981. Atlas du Rwanda. Imp. Vanden Brugge-44360, La Paquelais Paris. SCHOUTEDEN, H., 1966. La faune ornithologique du Rwanda.1966.
34. SOGREAH, 1991. Étude du plan directeur d'aménagement et de mise en valeur des vallées de la Nyabarongo et de l'Akanyaru, Étude d'environnement, Rapport général. Avenant n° 2.
35. VAN DE WEGHE, J.P et KABAYANDA, A., 1992. Le Parc National de la Ruvubu et sa région limitrophe: Étude d'identification. Étude n° ET/44/2/92-SEP Commission des Communautés Européennes, 195 pp.
36. Vital Signs Rwanda. (2018). Vital Signs Project Data. Kigali: Vital Signs Rwanda.
37. UNEP. (2011). Rwanda: From Post-Conflict to Environmentally Sustainable Development. Nairobi.
38. NISR and MINALOC. (2006). Revised Administrative Boundaries of Rwanda 2006. Kigali: National Institute of Statistics of Rwanda.
39. Nyandwi, E., Veldkamp, T., & Amer, S. (2016). Regional Climate Sensitivity of Wetland Environments in Rwanda: the Need for a Location-Specific Approach. Regional Environmental Change, 16(6), 1635–1647. https://doi.org/10.1007/s10113-015-0905-z

Official Use Only

40. Rwanda Atlas - Environment, Agriculture and Livelihood Options, (2018) Vital Signs Project.
41. VERSCHUREN, J., 1958. – Le statut actuel des grands ongulés du Congo belge et du Ruanda-Urundi, principalement dans les parcs nationaux. Mammalia, 22, 3: 406-417.
42. White, F. 1983. The vegetation of Africa, a description memoir to accompany the UNESCO/AETFA/UNSO vegetation Map of Africa (3, plate, North western Africa, North-easternAfrica, and Southern Africa 1:5,000,000) UNESCO, Paris

Official Use Only

List of Appendices

Appendix 1: Stakeholder Engagement

STAKEHOLDER ENGAGEMENT

Stakeholder engagement is a vital component of the ESIA process. The consultation and engagement process focus on providing information on the proposed project in a mannerthat can be understood and interpreted by the relevant audience. It enables to seek comment on key issues and concerns, sourcing accurate information, identifying potential impacts and offering the opportunity for alternatives or objections to be raised by the potentially affected parties, non-governmental organizations, members of the public and other stakeholders. Consultation has also been found to develop a sense of stakeholder ownership of the project and the realization that their concerns are taken seriously, and that the issues they raise, if relevant, are addressed in the RAP.

Consultations were conducted at National, District and Local levels. Consultations were held along the entire lengths of the power lines corridors during the period of 14th to 28th August 2023.

However, due to COVID-19 induced lockdown this activity was not done in classical way because in order to respect social distancing at some site we used telephone, and other communication means such as skype call and zoom. Despite these working conditions, in collaboration with local authorities we managed to have some consultation meeting with local population where social distancing guidelines were possible

1.1. Stakeholders

Key stakeholders have been identified and initial discussions held with decision making bodies,key stakeholders, sector institutions and specialist experts were made on the very conceptsand nature of the proposed project, giving emphasis on levels of public participation, role of keystakeholders and joint contributions of these actors to the success of the project. In addition,the scope of the proposed project and possible means of maximizing local communities' social, economic and environmental benefits from the project implementation were underlined. Key stakeholders identified for consultation during preparation and implementation of RAP include but not limited to the following:

At national level:

- Ministry of Environment (MoE);
- Ministry of Infrastructure (MININFRA);
- Rwanda Environment Management Authority (REMA);
- Rwanda Standards Board (RSB);
- Rwanda Development Board (RDB);
- Rwanda Land Management and Use Authority (RLMUA)
- Rwanda Utility Regulation Authority (RURA)
- Rwanda Water and Forest Authority (RWFA)

At local level:

Official Use Only

- Local Government Officials (Districts and Sectors);
- REG District Branch managers and
- Project Affected People (PAPs).

At Community level

Consultation with few members among the PAPs

Consultation and dialogue with PAPs is important for successful resettlement and/or compensation of the affected. The meeting was conducted by EDCL E&S Risk Management team from 14th to 28th August 2023. The consultation exercise identified PAPs who should be affected by the project and some of nearest of electricity transmission networks.

Appendix 1.1.: **Timeframe for the consulted stakeholders**

a. Districts Administration

Dates of consultation	**Administrative District name**	**Participants category**	**Participants by gender**		**Total**
			Male	**Female**	
23/08/2023	Karongi	Local authorities	43	17	60
		RAB/SAIP Staff			
		REG Staff			
24/08/2023	Ruhango	Local leaders	16	5	21
Total			**59**	**22**	**81**

b. Public and Private Institutions

Date of consultation	**Institution**	**Position**
24/08/2023	REMA	Biodiversity Sector Specialist
24/08/2023	MININFRA	Donor Coordinator
24/08/2023	NLA	Head of Land Administration Department
25/08/2023	RDB	EIA Specialist
		EIA Specialist
25/08/2023	RWB	Deputy Director General
25/08/2023	Rwanda Forest Authority	Director of Tree Seeds Unit
25/08/2023	Enviroserve Rwanda Green Park/ Rwanda E-waste recycling Facility	Technical Supervisor
25/08/2023	RURA	Director of electricity and Renewable Energy
25/08/2023	IRPV	Member of Committee on research and reference prices
25/08/2023	Energy Private Developers	Vice Chairman & Director of Operations and Development
28/08/2023	University of Rwanda-UR	Academician

Official Use Only

Date of consultation	Institution	Position
28/08/2023	Albertine Rift Conservation Society (ARCOS)	Landscape Manager
28/08/2023	Sustainable Agricultural Intensification and Food security Project (SAIP)/ Rwanda Agriculture Board (RAB)	District Project Coordinator

Appendix1.2: the list of consulted people.

Consulted people at Kigoma substation



Public consultation Ruhango district

Official Use Only



Consultation in Karongi district



Official Use Only

Consultation at Kigoma substation with the neighboring community

Official Use Only

Summary of public consultations and the opinions expressed

Appendix 1.3: - Summary of concerns and issues which rose during consultations in different districts of the project

Environmental Components	Major issues and concerns expressed
Perceptions and awareness of the public, in relation to the proposed project.	Consulted Communities in the project area were not aware of the project, but they agree and acknowledge the excellent/considerable importance of the project.
Land and soil protection issues	It was pointed that the land system is particularly dominated by customary law and therefore encourages land parceling and land disputes. For the case of Rwanda, land disputes are multiple and varied. Some result from the morphological and physiological nature of land while others are socio-demographic and socio-economic. The major concerns expressed are related to increase of erosion on watersheds, particularly on marginal or rugged lands The law on expropriation in the public interest no. 18/2007 of 19 April 2007 should be applied and it provides under Article 2 paragraph 2 fair compensation: compensation equivalent to the value of land and developments will be paid to the expropriated people and calculated by applying the market price. An additional and independent expertise is deemed useful for calculation of compensation and avoidance of land disputes. Given that land is not sufficient, concerns were focused on increase in land parceling. Fragmented lands loose their value and, at that time, they would like to take into account all lands of a household whose area of plots in the ROW is higher than that of residual lands.
Wetland and water resource protection	It was pointed that the land system is particularly dominated by customary law and therefore encourages land parceling and land disputes. For the case of Rwanda, land disputes are multiple and varied. Some result from the morphological and physiological nature of land while others are socio-demographic and socio-economic. The major concerns expressed are related to increase of erosion on watersheds, particularly on marginal or rugged lands. With erosion, there is sedimentation that could reach ponds and wetlands located downstream. The risk for destruction of soil protection structures (erosion control ditches, radical terracing) put in place was cited, but also increase of land disputes during valuation for expropriation and compensation. Given that land is not sufficient, concerns were focused on increase in land parceling. Fragmented lands loose their value and, at that time, they would like to take into account all lands of a household whose area of plots in the ROW is higher than that of residual lands.
Hardly accessible zones with steep slopes	The issue raised relates to tower installation in hardly accessible zones with steep slopes. For those areas, there was fear of downstream accidents related to landslides but also fall of stones removed from the rock. It was suggested to avoid access of heavy machinery to steep zones and make sure landslides are avoided, and check that the downstream part is not inhabited in order to provide for a warning system for the population.
Information about the project	Most authorities, especially, local authorities, were not informed about the project. At the end of discussions, they pledged their support, and found the project to be the solution for the issues of frequent power failures following insufficiency of electric power. It is also for them hope to operationalize planned projects related to rural development and fulfil their promises to the population in regards with grouped settlements. They requested strengthening of environmental protection measures and their involvement in monitoring the implementation of adverse impact mitigation measures. The population from the communities who were consulted manifested their full support to the project on condition that it would first allow rural connections. Thus, the project will enable them to be relieved of isolation and darkness.
Job opportunities	In the framework of poverty reduction, the government supports labor-intensive initiatives and projects. All the authorities had wished that this project could contribute to job creation in rural areas and increase the population's purchasing power, and lighten the poverty effects. Environmental impact mitigation projects would contribute to enhancing the population's purchasing power in a sustainable way, but also to environmental education and natural resource protection in a sustainable manner in the project's catchment area
Environmental education for the population	Consulted authorities showed their satisfaction with the project for environmental education opportunities for all the environment components. The project would be a major asset for educating the population on environmental protection programs given that at each district and sector, there is one person in charge of environment.

Consulted authorities showed their satisfaction with the project for environmental education opportunities for all the environment components.
The project would be a major asset for educating the population on environmental protection programs given that at each district and sector, there is one person in charge of environment.

2.1.Identification and Evaluation of Risks

2.1.1. Risk identification.

To identify the risks to the safety of the persons present on and near the site, the following rules shall be applied;

- Analysis of the work activities foreseen in the method statement. The Method Statement analysis shall be carried out before the commencement of the works, by the Resident Site Manager and the OHS officer to evaluate the risks related to the work activities,
- Identification of potentially dangerous activities,
- Risk factors identification,
- Risk evaluation based on the probability that the event (accident) will occur (probability) and the effects on the health of persons involved (damage) based on the experience held by the Contractor's similar projects or work conditions,
- Checking safe work procedures.

2.1.2. Method of evaluation

To evaluate the safety of the persons, present on and near the site, the following rules shall be applied;

- Analysis of the work activities foreseen in the method statement. The Method Statement analysis shall be carried out before the commencement of the works, by the Resident Site Manager and the Safety Officer to evaluate the risks related to the work activities,
- Identification of potentially dangerous activities,
- Risk factors identification,
- Risk evaluation based on the probability that the event (accident) will occur (probability) and the effects on the health of persons involved (damage) based on the experience held by the Contractor's similar projects or work conditions,
- Checking safe work procedures.

2.1.3. Hazard identification

The following risks have been identified because of the analysis of the work activities together with the tools, equipment, facilities, and dangerous or potentially dangerous materials that shall be used or present on site;
Risks for safety have therefore injuries or physical damages:

- **People falling to the ground**: Slides and falls on the plane of the job, provoked by the presence of oil, grease, or dirt on the points of grip (in the case of slope on means or cars), tripping hazards in the workplace, (for example miscellaneous debris or cords) or from bad conditions of the pedestrian visibility created by poor lighting.
- **People falling from high places (higher than 2m**): People fall from high places, due to the loss of equilibrium of the worker and/or to the absence of suitable protections (collective or individual), slips or trips, from improperly constructed temporary work, crane or within overly steep excavations, lifting or transport vehicles, or from any other higher job posting;
- **Drop of materials or tools**: Materials, tools, or objects dropped down from higher working places or fallen during transport with trucks, cranes, or other lifting means. Materials projected by blasting;
- **Running down by vehicles**: Personnel being rundown by improperly operated vehicles or allowing personnel to be in restricted areas or by personnel error;
- **Blows, knocks, impacts & compressions**: caused by violent contact with equipment, structures, or other object present in the workplace;
- **Pricks, cuts & abrasions**: cuts, punctures, and abrasions to the hands; bruises and traumas to the whole body without a specific location, for contact with the used utensil or consequent to bumps with any kind of object present in the work yard;
- **Heat, flames**: the accidental contact with parts or tools at high temperatures (welding tools, grinders, parts of engines, etc..), flames or materials (bitumen, hot liquids, etc..), the prolonged exposure to the heat or sunlight causes burns;
- **Electrocution or Fulguration:** Electrocution for direct or indirect contact with under-tension parts of the electric line or equipment;
- **Jets, squirts:** Lesions in any part of the body during the jobs performed by hand or with utensils, with material, substances, products, and equipment that can cause jets you squirt dangerous for the health. Lesions concerning any part of the body consequent to the projection of splinters or fragments during workmanships performed directly or in neighbouring postings of the job;
- **Hurling of particles into eyes**: Lesions at the eyes consequent to the projection of splinters or fragments during workmanships performed directly or in neighbouring postings of the job;
- **Fire explosion:** Lesions provoked by fires and/or consequent to the explosion due to the combustion of containers or reservoirs containing fuels, gasses, or chemical substances highly deflagrating or to the blasting of explosives;
- **Vehicle accident**: includes accidental contact between two or more vehicles or between a vehicle and a person.

Risks for health that need long exposure to the risk:

- **Vibrations and Noise:** damages to the skeletal and muscular apparatus caused by the vibrations transmitted to the worker by equipment, tools cars, or parts of them; damages to the auditory apparatus caused by the prolonged exposure to the noise produced by the processing,

tools, equipment, or plants;

- **Dust, fibres:** Damages to the respiratory apparatus and in general to the health of the worker, consequently to the exposure to fine course materials, or materials releasing minute fibres;
- **Non-Ionizing Radiations:** prolonged exposure to non-ionizing radiations as electromagnetic fields with extremely low frequencies, radio frequencies, microwaves, infrared, etc.;
- **Mineral Oils, hydrocarbons**: Dermatitis, coetaneous irritations, allergic reactions, or damages to the respiratory apparatus caused by the contact with mineral oils or hydrocarbons or inhalation of the vapours developed during the process;

Other risks are caused by an incorrect organization of the job site.

- **Loads manual handling**: Lesions to the skeletal and/or muscular apparatus during the manual handling of loads, because of their excessive weight or dimension or due to the incorrect position assumed by the worker during the handling;
- **Ergonomics**: Muscular pains because of wrong positions assumed during the use of the equipment;
- **Interferences**: Presence of different activities in the same or near the working area which can interfere and transfer risks of one activity to the workers engaged in another.

2.2.Risk assessment and Management.

2.2.1. Safety Inspections

Safety inspections will be made continuously by the site manager or appointed representative to identify any situation that could result in possible hazardous conditions before the start of work and as needed throughout the work. Where a safety representative finds evidence of a situation that could result in possible hazardousconditions, exposed employees will be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

2.2.2. Job hazard analysis

Job hazard analysis is a procedure that serves to identify risks associated with activities that need to beperformed during the project implementation. The analysis identifies risks and control measures are defined to ensure that such risks do not materialize when conducting the work. Based on the output of the analysis, activities shall be planned so that they are carried out under specified conditions to control the risks.
The project manager, site manager, and site supervisor shall prepare a Job Hazards Analysis for allimportant and higher-risk construction works. The job hazard analysis will assess the risks of the task to ensure that the health, safety, andenvironmental risks posed by the project activities are as low as reasonably possible. The job hazard analysis shall be a complement of the work method statements where local conditions for the project implementation will take place, these shall include:

- ✓ Reference to work method statements that describe the sequential steps of the task including before, during, and/or after the task;
- ✓ Hazards and risks posed by the task to people performing the task and to third parties;
- ✓ The need for PPE;
- ✓ Any limitations on other activities posed by the task and/or by adjacent activities;
- ✓ Any emissions to the environment resulting from the task.

The assessment will be performed early enough to allow any changes to the proposed task to be incorporated as necessary. For repetitive low-risk tasks, a generic job hazard analysis may be used.

2.2.3. Stop work authority.

Everyone involved in the project and site activities will have the responsibility and authority to ensurethat all personnel at the site always comply with the safe operation resulting in zero accidents. At the projectsite, everyone is authorized to stop work that does not comply with a safe operation. EDCL guarantees that there will be no repercussions for the persons who stop the work for any given reason.

2.3. Personal Protective Equipment

Personal protective equipment (PPE) protects employees from the risks of injury by creating a barrier against workplace hazards.

2.3.1. Appropriate personnel protective equipment

PPE must be used when the eyes, face, hands, extremities, or other parts of the body are exposed to workplace hazards that cannot be controlled by other means.

- **Head protection** will be worn on job sites when there are potentials of falling objects, hair entanglement, burning, or electrical hazards;
- **Eye protection** will be worn when there are potentials of hazards from flying objects or particles, chemicals, arcing, glare, or dust;
- **Protective footwear** shall be worn to protect from falling objects, chemicals, or stepping on sharp objects. Athletic or canvas–type shoes shall not be worn;
- **Body protection like overalls**, raincoats, etc. shall be provided and worn in all those activities where risks for the body (acids or corrosive substances, burns, pricks, cuts, abrasions, etc.) are present;

- A**ppropriate respiratory masks** shall be provided to prevent damage to the respiratory apparatus in the presence of dust, gasses, or other substances;
- **Protective gloves** or clothing shall be worn when required to protect against a hazard;
- **Harnesses and lanyards** shall be utilized for fall protection as required;

The use of other PPE shall be evaluated from time to time and provided and worn to the workers involved in the activity or exposed to the risk.

- **Distribution of PPE**

All new employees, before starting their activities, shall be provided with all the protective equipment needed in connection with the risks they can be exposed to in the course of their duties. Special PPE will be given to the workers in case of activities to be carried out. At the act of the delivery of the PPE, each worker shall be informed and trained on the correct way to use and conserve them. Each worker will sign for receipt of the PPE. Records of all the PPE given to each single worker, including any replacement, shall be kept, using individual cards, from the safety Department. The PPE will be replaced periodically or whenever they are damaged in a way to is useful for safety purposes. Checks shall be carried out on the existence, use, and condition of the personal protections assigned to each worker. Each worker who is found on site without the PPE will not be allowed to work and shall be sent out of the job site and sanctioned. If the item is misused, misappropriated, or lost, the worker shall be strictly sanctioned.

2.3.2. Type of Personal Protective Equipment (PPE)

Personnel at the project site shall wear appropriate PPE according to their area of work. PPE shallinclude but not be limited to:

- ✓ Head Protection / Hard hat with chin strap;
- ✓ Eye Protection / Safety Glasses with side covers;
- ✓ Foot Protection (Safety Boots);
- ✓ Hand Protection (Hand gloves);
- ✓ Flame, electrical and mechanical Resistance (Hand Gloves, Sleeves, boots, etc...);
- ✓ Face Protection (face shield);
- ✓ Fall protection (harness and fall protection equipment);
- ✓ Protective Clothing;
- ✓ High visibility safety Vest;
- ✓ High visibility clothing with reflecting bands;

The minimum required PPE includes a hard hat with a chin strap, a high visibility safety vest, and safety bootswith steel caps and ankle support. The PPE is to be used all the time. Employees are expected to report to work in adequate and appropriate construction clothing. Long pants and a T-shirt, both in good condition, are the minimum acceptable. Going shirtless is prohibited.

The distribution of PPE will be controlled with a form that will be filled during the distribution of the equipment. PPE distribution will be accompanied by a related training focusing on the correct use,maintenance, fault detection, disposal, and storage of each type of PPE. The site manager will keep control of the PPE required on-site and used by the workers. The projectwill have an adequate number of the above PPE for the replacement of damaged and out–of–standard PPE.

2.3.3. PPE for working at Heights.

Working at heights represents one of the most critical risks in the project. In addition to work preparations) special PPE shall always be used when conductingany activity under these circumstances. It is working at heights when the work implemented is 2 meters or more from the ground level.

- **Harness**: including hardware must be capable of withstanding a tensile loading without cracking, breaking, or taking a permanent deformation
- **Lanyard**: The lanyard must be a rope or shock-absorbing web lanyard. The lanyard and all its components in a fall arrest system must have a tensile strength. Locking-type snap hooks shall be used to connect the lanyard to the harness. The lanyard may be retractable allowing freedom of movement but protects the worker should a fall occur. A shock-absorbing lanyard will substantially reduce the force created during a fall. The maximum lanyard elongation when resisting a fall must not exceed 1.06 m in length.
- **Lifeline:** The lifeline can be horizontal or vertical. Vertical lifelines may only support oneworker.
- **Rope Grabs:** A person may be connected to a lifeline using a rope grab or by a rope grab and lanyard combination. The lanyard must be less than 1.8 m long to restrictthe overall fall to 1.8 m or less. The lifeline size must be stamped on the rope grab, andonly that size and type of line used.
- **Anchorage:** The strength of any fall protection system is dependent on a secureattachment point.
- **Rigging**: Anchor points should be as high as possible, but never lower than the connection point on the harness. Workers must be tied off

in a manner that ensures nolower level, or other surfaces are struck during a fall.

2.3.4. PPE maintenance and storage

The site manager and/or personnel allocated with the responsibility will ensure that reusable PPE isregularly inspected and tested under the manufacturer's specifications and the relevant Standards.

- ✓ All persons have a responsibility to verify the conditions of PPE before and after use to detect defects.
- ✓ All persons using a fall protection system must be trained on the safe use of the system including Proper fit, wear, inspection, limitations, and care of the system. Fall protection systems must be inspected before use, at intervals as established by the manufacturer.
- ✓ Cleaning agents or equipment will be supplied by the site manager to enable employees to clean reusable PPE as required.

2.4. Signs and markings

Signboards indicating the obligation to wear PPE, or other safety measures, as well as dangers or hazards, will be placed at the entrance and in the proximity of each working area. There are three major types of signs and markings, the samples of which shall be established in due time.

- *Warning signs: are used to properly identify and warn of possible hazards. They should have a triangular shape, black text on a yellow background, and should always include a pictorial symbol.*



Danger Noise Electrical Suspended Forklift Flammable Loads



Fallingfrom Highplaces Welding Batteryacids Explosion radiation

Mandatory signs: indicate that a particular course of action must be undertaken. They should have around shape anda white pictorial symbol on ablue background.



Prohibition signs: areusedtoproperlygiveaclearmessagethataceratinactionis prohibited. They should have a round shape, black pictorial symbol, white background, red border, and 45-degree red diagonal band across the symbol (from upper left to lower right).

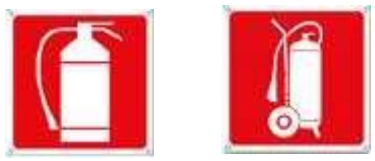


Safety signs: are used to properly identify the locations of emergency equipment. They have agreen background with white pictorial symbols.



Emergency Exit First Aid Meeting Point

Fire-fighting signs: Each item of Fire-fighting equipment should be marked with the appropriate symbol. Where various types of equipment are stored at one location, `Fire Point" signs may be used. When equipment is stored in a recess or cupboard, a panoramic sign, mounted well above head height, should be used to enable the equipment to be identified from a distance.



Fire Extinguishers

The proper use of these signs and the appropriate compliance with their indications shall prevent potentially dangerous situations and accidents.

2.5. Incident and accidents management

2.5.1. Incident Notification and Reporting

Contractors will notify the Project immediately following any environmental or social incident. The project will ensure that all environmental and social incidents are appropriately documented that the relevant parties are notified and that reporting requirements around the incident are met.

2.5.2. Injury and accident management

In case of injury, accident, or near miss, the workers involved must immediately report it to their Foreman, regardless of the seriousness of the event. Based on the nature/sources of the event (related to environment, health, or safety), the Foreman must implement promptly the emergency management procedure and inform the assigned Supervisor and the OHS Officer, for safety as soon as practicable. The OHS officer in collaboration with the Supervisor must immediately fill out the "notification report" and submit it to the SE. The SE must transmit it to the responsible persons based on the magnitude of the event. In case of a high-level injury/accident, the PM must be immediately informed by the SE. The PM must inform OIA management, the client, and the supervising engineer. The form filled by the OHS Plan shall include the following details;

- Description of the event;
- Causes of the event;
- Damages;
- Injury;
- Personnel or equipment involved in the event;
- Time of the Event;
- Place of the Event;
- Witnesses;
- Corrective Actions;
- Further information/attachments.

Whenever needed the OHS officer will request persons involved in the event or witnesses to provide input in the investigation form. The completed form must be then sent to the SE and subsequently to the PM for approval. Special attention to:

- Corrective measures identified and carried out with the designation of the responsible for corrective action and estimated date of closure;
- Proposed additional corrective measures with the designation of the responsible for corrective action and estimated date of closure.

Accident cases must be discussed during specific Safety Talks, called as soon as possible by the OHS Officer and involving at least the Supervisor, SE, and the foreman having witnessed the event. Record of the meeting must be prepared by the OHS Officer and transmitted to all the participants. At the estimated scheduled corrective action date of closure, the OHS officer checks the implementation of the action. In case the required actions have not been fulfilled the OHS officer requires the support of the

The OHS officer must fill out the "Monthly Injury Report and HS metrics" In addition, after any injury/accident/near miss event, the OHS officer must update the "record book". The PM, according to information contained in the Monthly Injury Reports and injury/accident reports, must fill monthly overall reports that must be sent to the Site Client Representative.

2.5.3. First Aid and Emergency Medical

Provisions shall be made so that response times are not exceeded.

- ✓ an injured person will be treated by a first aider **within 5 minutes of the incident**.

- ✓ a seriously Injured person will be treated by a medical professional **within one hour of the incident**. This will normally be at the hospital, or a suitable health Center.

Numbers of First Aiders

Where 5 – 50 workers there should be at least one qualified first aider present all the time. A further first aider is required for every additional 50 workers. A team member can act as a first aider if he/sheholds adequate training.

It may be that additional qualified first aiders are required to achieve the response timesdetailed in this sheet. Also, if there are additional hazards and risks.

First Aid Kits on Site

- ✓ All projects and work areas must have at least one first aid kit. With additional kits for each 50 workers.
- ✓ First aid kits shall be constructed of resistant material, dustproof, and of sufficient size to store the required contents. They must be capable of being sealed and have a handle for emergency transport.
- ✓ The exterior of the first aid kit must be labelled in a manner that will identify, for example - “First Aid”.
- ✓ Contents of the kits shall be suitable and sufficient for the site.

2.5.4. Incident report and notification

2.5.5. Contact information:

A list of contact persons in case of emergency will be disclosed to all site workers. this includes contact for the site manager, EHS staff project manager, a nearby hospital, nearby Police Station Traffic, and Road Safety; Fire Brigade, Traffic Accidents; Child-Help Line; Anti-GBV; Anti-Corruption; and Ambulance only to mention but a few.

2.5.6. Communication

EDCL recognizes that the objectives of OHSP can only be achieved with effective communication. With this inmind, numerous mediums will be used to educate, raise OHSP awareness, motivate and stimulate participation. These may include:

- ✓ Safety Bulletins;
- ✓ Clear meeting agenda and meeting minutes;
- ✓ Bulletin boards, posters, or banners
- ✓ E-mail communication;
- ✓ Reports and Campaigns;
- ✓ Toolbox talks;
- ✓ Job hazard analysis.

2.6.Material and works handling.

2.6.1. Electrical facilities and installation

- Electrical connections and related works must be performed by qualified electricians, or under strict supervision of qualified professionals.
- Electrical systems shall comply with the local regulations on High and Low Voltage Facilities.
- The distribution centers shall consist of standard steel cabinets, with a mounting plate at the rear, readily accessible from the outside. They have doors fitted with thumb latches and triangular keys and are suitable for the installation of padlocks.

In addition, they are provided with the following:

- Automatic sectionalizing switch;
- Grounding network (the resistance of the grounding network shall not be greater than that against which it protects, depending on the sensitivity of the differential breaker);
- Differential circuit−breaker.

The differential circuit breaker shall have medium sensitivity in the usual case that the equipment and machines are connected to the ground network and the resistance of said equipment does not exceed 20 Ohms. To protect against overloads and short circuits, the provision shall be for automatic fuses of the magneto−thermal type. From these general distribution centers, connections shall be made for the secondary circuits, which, in turn, shall be provided with cabinets fitted with watertight inlets, with the power being supplied always through a female socket. Such secondary boards

shall be provided with a general ground terminal, a standard Omni−pole circuit breaker (with circuits calibrated for each of the taps, a maximum of three), and a high−sensitivity differential breaker (30 mA). Where portable devices are used in high−humidity areas, provision shall be made for safety transformers, with a maximum rating of 220 volts, or a safety voltage shall be used (24 V).

As a rule of thumb and nail, the following precautions shall be taken about these facilities:

- Both the board and equipment terminals shall be protected with insulating tape;
- The cables that supply power to the equipment and tools shall be provided with protection covers, which shall be of the humidity−proof kind and shall not touch, or be laid, on the floor in passage areas;
- It is strictly forbidden to use cables with bare tips unless properly connected. Plugs should be used;
- All power lines shall be disconnected by switching the breakers off;
- Periodic servicing of all the facilities is essential. This servicing shall be thorough and conducted by specialized personnel;
- Notices shall be used to indicate all electrical risks, as well as the performance of servicing work;
- In case of ongoing electric shock that has not been controlled by switch-breakers, the cable giving electricity has to be disconnected immediately without touching the part of the cable/appliance that is causing the accident.

2.6.2. Load handling.

Load handling implies potential hazards, with high−risk levels for both operators and labor working in the handling area; also, the handled load could get damaged. This activity requires especially trained personnel and lifting/harnessing equipment in mint conditions and adequate for the load to be handled. The basic elements are the load to be handled and the handling operation to be carried out. In function of the load and of the type of handling, you must carry out a careful selection of handling and harnessing equipment.

- Load to be handled and handling operation

- All the selected personnel must know the following load characteristics:
- Typology;
- Weight;
- Center of gravity;
- Harnessing points.

All the selected personnel must know and evaluate the following details of the handling operation:

- Distance and gradient between harnessing point and landing point;
- Transport route and possible obstacles to overcome;
- A complete view of the operation;
- Difficulties related to final positioning;
- Details of the equipment to be used to move the load.

- **Typology**
  - Typology means the shape and physical characteristics of the load to be handled. The shape can be regular or irregular, and this can imply stability or instability. The shape can have a small or big volume and/or it can be quite long (for ex. piping), and this can make handling easy or hard due to narrow spaces, hindrances, or external actions (for ex. wind). The load physical and characteristics are very important:
  - A fragile solid (for ex. glass) also requires precautions as an accidental bump can damage the entire load;
  - A load placed inside a package also requires precautions; if the materials placed inside are not correctly secured, they can create a displacement of the center of gravity due to oscillation;
  - Flexibility of the materials must be considered.
  - The transport of people using lifting devices is forbidden unless specific qualified equipment (basket) is used.
- **Weight**

Knowing the weight of the load to be moved is essential. The weight must be recorded on the documents supporting the load or on the product manufacturing drawings. In their absence, it is necessary to assess the weight that must be estimated in excess (For ex. a metal body with a cavity must be evaluated as if it were a full solid).

- **Center of gravity**

The center of gravity of the load to be handled is a critical element. This element is fundamental also for storage operations (load stability). Depending on where an item's center of gravity is located the item at rest may be in a stable or unstable condition. When the item is to be moved it is important to review the positions of the lifting points about the item's center of gravity.

The center of gravity, if not identified on supporting documents, products, or manufacturing drawings, is quite easy to determine on a regular body, but very hard on irregular bodies or packages that have not been inspected. In such a case, the lifting initial stage is fundamental to identifying the

center of gravity (the lifting device hook always tends to position itself in correspondence with the center of gravity).

- **Harnessing points**

In many cases, load feature harnessing points are included during the product design stage, and in such cases, identified during the manufacturing. It is important not to mix these harnessing points with those of the single components forming the product. In other cases, the products have threaded holes for installing eyebolts or shackles: such harnessing points must be included during design and identified on the manufacturing drawings. In many cases, the hook-up man decides the harnessing points, and in this case, the choice must be carried out with extreme attention, and in particular:

- Harnessing points must guarantee a firm hooking and grip also in the event of a bump or loosening of the harnessing equipment;
- The center of gravity must be below the harnessing points;
- The center of gravity must be vertical compared to the lifting hook.

2.6.3. Lifting equipment

Where no particular requirements are specified, the following general safety requirements are considered sufficient:

- All lifting operations must be directed by only a single crane operator standing in a safe position;
- All the lift equipment and means must be following the Ugandan and international law and standards;
- Before starting to use lifting equipment, the SE must ensure that there is no wind speed faster than 40 km/hour;
- Before starting any lifting/translating operation, a sound alarm must be activated to advise all present persons of the beginning of the operations;
- Before starting any lifting activity all safety devices such as limit−switch devices and brakes, must be checked;
- Before every use the lifting device is given a reasonable visual inspection to check that the equipment looks to be in good repair and then every 3 months a more thorough visual inspection is performed for every chain, rope, hook, shackles, brakes, etc.…;
- The lifting means and equipment and materials to be lifted must not be used unless it is of good construction, sound and suitable material, adequate strength, free from patent defect, and properly maintained;
- All the lifting equipment must be tested and examined by or on behalf of the manufacturer or by an authorized person and a certificate of the test and examination specifying the safe working load, signed by or on behalf of the manufacturer or by the authorized person is obtained and kept available for inspection;
- No guards of safety devices shall be disabled or removed.
- All the lifting equipment must be provided with a schedule with a load diagram that shows the load that is possible to lift including safe lifting loads as a function of the length of the boom;
- Use steps and handholds when mounting or dismounting any machine;
- Clean any mud or debris from steps, walkways, or work platforms before using them;
- Always face the machine when using steps, walkways, and handholds;
- Never transport persons inside buckets (unless specifically designed for personnel), on walkways, or platforms;
- Never stand near the operating machine while lifting or transporting materials;
- Drivers and operators must always keep safety belts fastened while operating;

2.6.4. Walking and working surfaces.

Walking and working surfaces shall be kept free of debris and other tripping hazards. Holes and ground openings, such as those created for the casting of foundations, shall be marked with demarcation procedures and material approved by local regulation and customer requirements suchas caution tape, flagging, or local material such as thornbushes. This fulfills the goal ofstopping intruders, persons, or animals, from accidentally falling into these openings.

2.6.5. Ladders handling

Except where either permanent or temporary stairways, ramps, man hoists, or runways are provided,ladders meeting these requirements shall be used to provide access to all elevations.

Portable Ladders

The design, construction, use, and maintenance of portable ladders shall comply with the next safety requirements for "Portable Wood Ladders", and "Portable metal Ladders".

- Portable ladders used for access in the absence of fixed ladders, these shall be secured against accidental displacement at the top and bottom.
- Portable ladders shall rest on a firm foundation capable of supporting the load without displacement in any direction.
- Ladders shall be equipment with safety shoes, spurs, spikes, tread feet, or other approved slip-resistant devices at the base section of each rail. The devices shall be designed to foundation at the specified angles of inclination and on the type of surface available.

Ladders General Instructions.

- All portable ladders shall be always kept in good condition;
- A competent person shall inspect ladders at intervals not greater than two weeks;
- Any ladder found defective in any way must be returned to the contractor's store and thereafter destroyed.

Use of portable ladders should be restricted to when:

- It is impossible or impracticable to use other, safer means of access;
- Access is required irregularly and for a short term;
- There is only a need for one person at a time to use the ladder;
- There is no need to carry loads exceeding the carrying capacity of one man;
- The ladder is not required to exceed the maximum height of 10 m between landings (in all cases it should be supported to present any undue sagging);
- Ladders must be inspected before use for cracked or split stiles, missing, broken, lost or damaged rungs, and splinters. To facilitate inspection, ladders should be kept free from dirt and grease. Timber ladders must not be painted, but may be treated with a preservative, which does not obscure defects;
- Ladders must be of adequate length to enable them to extend to at least 10 m above the platform or working point unless other suitable handholds are available.

It is dangerous:

- ✓ To use ladders that are too short to provide access and handholds, when work is to be carriedout from the ladder;
- ✓ To use short ladders spliced together;
- ✓ To place ladders on insecure supports (loose bricks or other loose packing) to obtain extraheight;
- ✓ When using extension ladders an overlap of two rungs is recommended for a length of 5 mand four rungs for a 7 m long ladder.

Note: The use of ladders in a horizontal position as scaffolding is forbidden.

2.7.Work at heights

2.7.1. General requirements

Working at heights represents one of the most critical risks in electrification projects. In addition to work preparations, special PPE shall always be used when conductingany activity under these circumstances. It is working at heights when the work implemented is 2 m or more from the ground level.

- ✓ **Harness**: including hardware must be capable of withstanding a tensile loading withoutcracking, breaking, or taking a permanent deformation
- ✓ **Lanyard**: The lanyard must be a rope or shock-absorbing web lanyard. The lanyard and allof its components in a fall arrest system must have tensile strength. Locking-type snap hooks shall be used to connect the lanyard to the harness. The lanyard may be retractable allowing freedom of movement but protects the worker should a fall occur. A shock-absorbing lanyard will substantially reduce the force created during a fall. The maximum lanyard elongation when resisting a fall must not exceed 1.06 m in length.
- ✓ **Lifeline:** The lifeline can be horizontal or vertical. Vertical lifelines may only support oneworker.
- ✓ **Rope Grabs:** A person may be connected to a lifeline using a rope grab or by a rope grab and lanyard combination. The lanyard must be less than 1.8 m long to restrict the overall fall to 1.8 m or less. The lifeline size must be stamped on the rope grab, andonly that size and type of line used.
- ✓ **Anchorage:** The strength of any fall protection system is dependent on a secureattachment point.
- ✓ **Rigging**: Anchor points should be as high as possible, but never lower than the connection point on the harness. Workers must be tied off in a manner that ensures no lower level, or other surfaces are struck during a fall

2.7.2. Safety while working at heights and permanent attachment.

OHS staff will train project employees in the hazards and control measures associated with working at heights, will make sure that personnel is permanently attached, and will make maximum use of primary fall protection systems, such as scaffolds, aerial lifts, personnel hoists, etc. The contractorwill use safe work procedures and enforce, among others, the following prevention/protection measures:

- ✓ Evaluate all overhead work for fall exposures and pre-plan and install required fallprotection systems before assigning the work to employees;
- ✓ Adopt a 100% fall protection policy that makes provision for secondary fall protection forall employees who are working more than 2 m above ground or other solid objects.
- ✓ All fall protection devices will be manufactured and used by a recognizedinternational standard;
- ✓ Review work to identify the methods to achieve 100% fall protection beforethe commencement of such work;

- ✓ Require the inspection of fall protection equipment before each use;
- ✓ Defective equipment will be removed from service and destroyed;
- ✓ Contractor shall ensure that each & every activity has fall protection rescue plan;
- ✓ All lifeline equipment (cable, connectors, supports, etc.) shall be part of the system and will only be used for fall protection;
- ✓ Ensure that persons working at height will have their safety helmets secured by chinstraps to retain the helmet on the head;
- ✓ Ensure systems are in place to prevent tools, materials, and other objects from falling fromheight.

2.8.Fire prevention and protection.

Fire protection and prevention shall be followed throughout all phases of the construction anddismantling. This is to be followed by the project team and its subcontractors.

As fire protection requirements occur, there shall be no delay in providing the necessary equipment. The following points are suggested for the prevention of fire.

- Know the place of work, fire hazards, and the location of firefighting equipment;
- Keeps all the firefighting equipment clear of obstructions.;
- Provide easy access to firefightingequipment to save time and minimize any damage due to fire;
- Keep the place of work clean and tidy;
- Do not smoke in 'No Smoking' zones. Do not carry lighted cigarettes hot substances or anysources of ignition where flammable materials are used or stored;
- Avoid the contact of oil, grease, or paint with oxygen cylinders. There may be an explosion due tooxidation;
- Switch off the main supply if electrical equipment is not in use;
- Never throw lighted cigarettes and burning sticks into dust bins, they may ignite and create a firewhen you are not there;
- Special purpose electrical equipment shall only be used at storage places for hazardous/flammable material;
- Training will be provided to employees in the proper use of fire extinguishers, fire prevention,and fire precautions.

2.9.Site roads and transport of material

One ne of the first causes of injuries on site is vehicular accidents. Site roads shall be:

- Wide enough to allow the free circulation of the vehicles in both ways. In case the ground morphology does not permit the realization of a double-way road, then lay−by shall be foreseen;
- Maintained always in good condition, clean of mud and free stones, and free of holes;
- Speed reducers like bumps or trenches shall be done across the roads before dangerous curves, bottlenecks, or dangerous areas; this procedure shall follow the Traffic rules of the Project.

The following rules shall be followed inside the site area:

Maximum speed for all the vehicles shall be fixed unless otherwise specified in the traffic management rules:

- 50 km/h on-site roads;
- 30 km/h in the proximity of working areas;
- Overtaking between trucks in busy work areas is not allowed;
- Any vehicle descending a downhill road shall give way to the one rising.

Outside the project area, the country traffic rules shall be respected. Anyone found not respecting the above rules will be subject to disciplinary measures.

2.9.1. Work on roads.

Most of the project work will be done closer to the local roads. Risk shall be assessed before the start, and a written method statement submitted to the project manager or site manager for approval. The method statement shall detail controls including, speed restrictions, warning signs and cones, barriers, and type. Where significant risk of traffic collision vehicle blocks shall be used. Under specific circumstances, in case of an existing overhead crossing of a conductor above a road, adequate scaffolding shall be installed based on EDCL's best practices.

2.9.2. Driving, traffic, and transport Safety

Driving and traffic are regarded as the most dangerous part of the job, not only because of the potentialbodily injuries but also because of the high frequency of occurrence. To minimize the impact and frequency of occurrences, the next guidelines are to be followed. Make sure all cars and trucks are equipped with working safety belts in all seats.

- ✓ Seat belts must be used all the time;

- ✓ All vehicles should be equipped with a first aid kit and fire extinguisher;
- ✓ Monthly inspections of vehicles including General, Fluids, Lights, and Safety.
- ✓ Do not drive if you are tired;
- ✓ Separate bags and boxes from passengers;
- ✓ Do not engage in reckless driving and do not exceed the speed limits;
- ✓ Do not use the mobile phone while driving, not to make calls, nor for texting;
- ✓ Being intoxicated when driving or operating machinery will lead to dismissal;
- ✓ Make inspections of cars, trucks, and driving behavior part of all safety walks;
- ✓ Minimize driving in the dark.

2.9.3. Heavy motor vehicles

Heavy motor vehicles are intended to be used mostly at the project sites to transport project materials including transformers and poles. Specific competency is needed to operate heavy motor vehicles, as well as adequate training and a fit-for-purpose driving license. In addition to this, some requirements are needed to make the project utilization safe:

- ✓ Heavy construction equipment should have a reverse signal alarm;
- ✓ The reverse alarm should be checked, and defective alarms will be replaced;
- ✓ A flagman, warning signs, or other controls will be provided when operations or equipmenton/or adjacent to street traffic create a traffic hazard;
- ✓ All drivers must always keep valid Driver Licenses;
- ✓ Seat belts shall be always worn when in vehicles;
- ✓ The speed limits shall be strictly observed;
- ✓ Traffic violations beyond a simple speeding ticket shall be reported to your supervisor;
- ✓ Before loading, unloading, or conducting any activities around a vehicle, the vehicle shall beplaced in park or gear, the vehicle shut off, and the parking brake set;
- ✓ On inclines, vehicles shall be choked, and the wheels turned into the curb;
- ✓ When being loaded or unloaded by a fork truck or other piece of equipment, the vehiclewheels shall be checked to ensure that no movement occurs;
- ✓ Passengers are not allowed to ride in the back of pickup trucks together with bags or boxes;
- ✓ Riding as a passenger on any equipment is prohibited unless the equipment has the safecapability of transporting personnel and was intended for such use.

2.9.4. Light vehicle operations

The following rules concerning vehicles will be implemented:

- ✓ Only licensed drivers shall be allowed to operate vehicles;
- ✓ Seat belts shall be always worn when in vehicles;
- ✓ The speed limits shall be strictly observed;
- ✓ Before loading, unloading, or conducting any activities around a vehicle, the vehicle shall beplaced in park or gear, the vehicle shut off, and the parking brake set.
- ✓ When being loaded or unloaded by a fork truck or other piece of equipment, the vehiclewheels shall be checked to ensure that no movement occurs.

2.10. Housekeeping, Tools, and equipment handling

2.10.1. Housekeeping

Good housekeeping practices will be maintained on all work sites. Before leaving for the day, personnel will ensure that all equipment is secured, trash and debris are removed from the site, and adequate safety indications are installed to avoid harm to members of the public. The foreman must conduct a final walk-through of the job site before leaving to inspect for anytripping, foot penetration, or fire hazards.

All personnel's eating and sanitary facilities will always be maintained in a clean and sanitary condition. contractors will provide the necessary resources to accomplish this, including adequate washing facilities unless mutually agreed with the subcontractors. In this case, contractors will ensure that sub-contractors fulfill adequate requirements.

2.10.2. Slips, trips, and falls

Site personnel will ensure that any instances of poor housekeeping resulting in the creation of tripping,slipping, or other hazards are corrected

immediately. It will be ensured that work areas are orderly and regularly maintained. They will be maintained clearof debris, waste, and other rubbish. To minimize any incidents to bystanders, site personnel shall identify work areas through cleardemarcation signs to avoid access to restricted zones:

2.10.3. Tools and equipment

To ensure a safe operation, the following guidelines are described:

- ✓ All tools are used by the manufacturers' recommendations; have required guards in place; and, are maintained in good working order as per manufacturer's recommendations;
- ✓ All vehicle/equipment operators are competent and licensed;
- ✓ All equipment used follows certification and legislation requirements;
- ✓ Powered tools and equipment will only be used by operatives trained in their use;
- ✓ Tools and equipment have been inspected before use on-site, including hired tools and equipment. The inspection shall be carried out by a competent person. For electrical tools this will be done by a qualified electrician;
- ✓ Major equipment is individually numbered, labeled, and registered;
- ✓ No modified equipment is brought on-site unless the modification has been approved by a competent person (i.e. typically the equipment supplier or vendor or an engineer);
- ✓ Inspection systems meet the manufacturer's or supplier's specifications.

Heavy equipment shall be thoroughly inspected before use. The foreman will inspect the equipment, usingan approved checklist, when the equipment is first placed at the job site and whenever the equipment is demobilized and successively placed back on the job site.

All repairs on machinery or equipment shall be made at a location that will ensure the safety of the mechanics, e.g. heavy machinery, equipment, or parts thereof that are suspended or held apart by the use of slings or jacks shall also be substantially blocked or cribbed before personnel are permitted to work underneath or between them.

Any guard or safety device removed or made ineffective for any piece of equipment used at the site or during repair or maintenance shall be replaced or restored to safe operation condition, immediatelyafter completion of the repair that requires its removal.

2.10.4. Hazard material awareness

Whenever in use of hazardous materials and chemicals, the following measures will be adopted:

- ✓ Material containers will be labeled as to contents and hazards;
- ✓ Material Safety Data Sheets will be available, on-site, for review by employees;
- ✓ A Material Safety Data Sheet will be on-site before any hazardous material is brought onto the job site;
- ✓ All employees shall be trained in the recognition, proper handling, and use of hazardous substances;
- ✓ Product containers are to be properly labeled.

2.11. Alcohol and Drug Control Plan

The consumption of alcohol and drugs in the workplace can cause changes in the behavior ofworkers (loss of concentration and reaction time) and lead to situations of risk with disastrous consequences for the workers and their companies.

As the construction activity is considered high risk, is of particular importance to preventing andcontrolling alcoholism, to increase the quality of life of employees and the contractor's performance.

The consumption of alcohol and drugs on the work site during working hours is strictly prohibited. Information sessions will be held to prevent hazards caused by the consumption of alcohol and drugsIt is also prohibited to perform any work whilst affected by alcohol or drugs.

Smoking is prohibited on-site or at any project office or project location.

Appendix 3: Vegetation types crossed by the TL (Estimated RoW)

District	Vegetation type	Expected (Ha)	Percentage of on entire ROW	Total (Ha)
Karongi	Mixed Crops (beans,	13.628	37.50%	36.338

	maize, sorghums)			
	Banana plantation	2.64	7.26%	
	Forest.	7.64	21.02%	
	Grassland	3.11	8.56%	
	Tea and coffee plantation	9.32	25.65%	
Ruhango	Banana	1.65	8.68%	19.01
	Forest	6.71	35.30%	
	Coffee	2.15	11.31%	
	Others	8.5	44.71%	
Total				**55.35**

Appendix 4: Observed fauna types in the project area

District	**Observed fauna types in the project area**			
	Mammal	**Bird**	**Amphibian/ Reptile**	**Fish**
Ruhango	Mice, Jackals, Bats	Black Eagles, Grey-headed Sparrow, Village Indigobird, Tropical Boubou, Tambourine Dove, African Paradise, Black-headed Heron	chameleon, gecko, a variety of frogs, a variety of snakes	No fish
Karongi	Different known mammals in Nyungwe, such as the cerval cat, mongoose, congo clawless otter, leopard and species of primate.	Different bird's species including Red-collared Babbler and other Albertine Rift Endemic species. Butterflies are also a common sight	Anoline Lizard, chameleon, gecko...	*Nile tilapis, ripon barbel, East African, Red-finned barb, barbus salmo*

Appendix 5: Chance find procedures

Chance find procedures under Accelerating Sustainable and Clean Energy Access Transformation Project will be designed as follows:

- Immediate Stop the construction activities in the area of the chance find.
- Delineate the discovered site or area.
- Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be present until the responsible local authorities take over. The Institute of National Museum of Rwanda shall be responsible for significant movable and immovable cultural property that pertains to Rwanda history, heroes and the conservation of historical artifacts and the National Museum shall be responsible for significant movable and immovable cultural and natural property pertaining to collections of fine arts, archaeology, anthropology, botany, geology, zoology and astronomy, including its conservation aspect. Institute of National Museum of Rwanda Cultural Properties Division take over. The address of Institute of National Museum of Rwanda is as follows:
    - Rwanda, Huye
    - Address: SH 1RD 2
    - P.O.BOX 6397, Kigali
    - +250730741093
    - +250783379597
    - E-mail: info@museum.gov.rw
- Notify the supervisory Engineer who in turn will notify the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division immediately (less than 24 hours).
- Contact the responsible local authorities and the Institute of National Museum of Rwanda Cultural Properties Division who would be in charge of protecting and preserving the site before deciding on the proper procedures to be carried out. This would require a preliminary evaluation of the findings to be performed by the archaeologists of the Institute of National Museum of Rwanda Cultural Properties Division

(within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage, including the aesthetic, historic, scientific or research, social and economic values.

- Ensure that decisions on how to handle the finding be taken by the responsible authorities and the Institute of National Museum of Rwanda Cultural Properties Division. This could include changes in the layout (such as when the finding is an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage.
- Implementation for the authority decision concerning the management of the finding shall be communicated in writing by the Institute of National Museum of Rwanda Cultural Properties Division; and
- Construction work will resume only after authorization is given by the responsible local authorities and the Institute of National Museum of Rwanda, Cultural Properties Division concerning the safeguard of the heritage.
- These procedures must be referred to as standard provisions in construction contracts, E&S risk management Procedures for Inclusion in the Technical Specifications for Contracts. During project supervision, the Site Engineer in collaboration with the contractor E&S risk management team shall monitor the above regulations relating to the treatment of any chance find encountered are observed.
- Relevant findings will be recorded by the E&S team and will be reported in monitoring and Evaluation Report on quarterly basis to the World Bank, and Implementation Completion Report on E&S risk management part will assess the overall effectiveness of the project's cultural property mitigation, management, and activities when the chance find encountered during the implementation.

Appendix 6: Environment Health and Safety Guidelines for Electric Power Transmission and Distribution[5]

The EHS Guidelines for Electric Power Transmission and Distribution include information relevant to power transmission between a generation facility and a substation located within an electricity grid, in addition to power distribution from a substation to consumers located in residential, commercial, and industrial areas.

1. **Environmental Impacts mitigation guidelines**

Right-of-way construction

- Proper Site transmission and distribution rights-of-way, access roads, lines, towers, and substations to avoid critical habitat through use of existing utility and transport corridors for transmission and distribution, and existing roads and tracks for access roads, whenever possible;
- Installation of transmission lines above existing vegetation to avoid land clearing;
- Avoidance of construction activities during the breeding season and other sensitive seasons or times of day;
- Revegetation of disturbed areas with native plant species; Removal of invasive plant species during routine vegetation maintenance (see right-of-way maintenance section below).

Right of way maintenance

- Implement an integrated vegetation management approach (IVM). The selective removal of tall-growing tree species and the encouragement of low-growing grasses and shrubs. Observing manufacturer machinery and equipment guidelines, procedures with regard to noise, and oil spill prevention and emergency response;
- Avoiding clearing in riparian areas;
- Avoiding use of machinery in the vicinity of watercourses.

Forest Fires

- Monitoring right-of-way vegetation according to fire risk;
- Removing blowdown and other high-hazard fuel accumulations;
- Time thinning, slashing, and other maintenance activities to avoid forest fire seasons;
- Planting and managing fire resistant species (e.g. hardwoods) within, and adjacent to, rights-of-way; Establishing a network of fuel breaks of less flammable materials or cleared land to slow progress of fires and allow firefighting access.

Avian and Bat Collisions and Electrocutions

- Aligning transmission corridors to avoid critical;
- Maintaining1.5 meter (60-inch) spacing between energized components and grounded hardware or, where spacing is not feasible, covering energized parts and hardware;
- Considering the installation of underground transmission and distribution lines in sensitive areas (e.g. critical natural habitats).

Aquatic Habitat Alteration

- Site power transmission towers and substations to avoid critical aquatic habitat (e.g. watercourses, wetlands, and riparian areas;
- Minimizing clearing and disruption to riparian vegetation.

Electric and Magnetic Fields

- Evaluating potential exposure to the public against the reference levels developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP). Average and peak exposure levels should remain below the ICNIRP recommendation for General Public Exposure;
- Considering siting new facilities so as to avoid or minimize exposure to the public. Installation of transmission lines or other high voltage equipment above or adjacent to residential properties or other locations intended for highly frequent human occupancy, (e.g. schools or offices), should be avoided;
- If EMF levels are confirmed or expected to be above the recommended exposure limits, application of engineering techniques should be considered to reduce the EMF produced by power lines or transformers.

Hazardous Materials

- The use of SF6 should be avoided due to its potential GHGs potential effect.
- Replacing existing transformers and other electrical equipment containing PCB, and ensuring appropriate storage, decontamination, and disposal of contaminated units;
- Prior to final disposal, retired transformers and equipment containing PCB should be stored on a concrete pad with curbs sufficient to contain the liquid contents of these containers should they be spilled or leaked. The storage area should also have a roof to prevent precipitation from

[5] For more information visit https://www.ifc.org/content/dam/ifc/doc/2000/2007-electric-transmission-distribution-ehs-guidelines-en.pdf

collecting in the storage area. Disposal should involve facilities capable of safely transporting and disposing of hazardous waste containing PCB.

Wood Preservatives

- Poles should be pre-treated at an appropriate facility to ensure chemical fixation and prevent leaching, and to impede the formation of surface residues at the right-of-way.

2. **Occupational Health and Safety guidelines**

Occupational health and safety hazards specific to electric power transmission and distribution projects primarily include Live power lines; Working at height; Electric and magnetic fields; Exposure to chemicals.

Live Power lines

- Only allowing trained and certified workers to install, maintain, or repair electrical equipment;
- Deactivating and properly grounding live power distribution lines before work is performed on, or in close proximity, to the lines;
- Ensuring that live-wire work is conducted by trained workers with strict adherence to specific safety and insulation standards;
- Workers should not approach an exposed energized or conductive part even if properly trained unless: The worker is properly insulated from the energized part with gloves or other approved insulation, or the energized part is properly insulated from the worker and any other conductive object, or the worker is properly isolated and insulated from any other conductive object (live-line work);
- Where maintenance and operation is required within minimum setback distances, specific training, safety measures, personal safety devices, and other precautions should be defined in a health and safety plan;
- Workers not directly associated with power transmission and distribution activities who are operating around power lines or power substations should adhere to local legislation, standards, and guidelines relating to minimum approach distances for excavations, tools, vehicles, pruning, and other activities;
- Minimum hot stick distances may only be reduced provided that the distance remaining is greater than the distance between the energized part and a grounded surface.

Working at height on poles and structures

- Testing structures for integrity prior to undertaking work;
- Implementation of a fall protection program that includes training in climbing techniques and use of fall protection measures;
- Inspection, maintenance, and replacement of fall protection equipment; and rescue of fall-arrested workers, among others;
- Establishment of criteria for use of 100 percent fall protection (typically when working over 2 meters above the working surface, but sometimes extended to 7meters, depending on the activity). The fall protection system should be appropriate for the tower structure and necessary movements, including ascent, descent, and moving from point to point;
- Installation of fixtures on tower components to facilitate the use of fall protection systems;
- Provision of an adequate work-positioning device system for workers; Connectors on positioning systems should be compatible with the tower components to which they are attached;
- Hoisting equipment should be properly rated and maintained and hoist operators properly trained;
- Safety belts should be of not less than 16millimeters (mm)(5/8 inch) two-in-one nylon or material of equivalent strength. Rope safety belts should be replaced before signs of aging or fraying of fibres become evident;
- When operating power tools at height, workers should use a second (backup) safety strap;
- Signs and other obstructions should be removed from poles or structures prior to undertaking work;
- An approved tool bag should be used for raising or lowering tools or materials to workers on structures.

Electric and magnetic fields Electric and magnetic fields (EMF)

- Identification of potential exposure levels in the workplace, including surveys of exposure levels in new projects and the use of personal monitors during working activities;
- Training of workers in the identification of occupational EMF levels and hazards;
- Establishment and identification of safety zones to differentiate between work areas with expected elevated EMF levels compared to those acceptable for public exposure, limiting access to properly trained workers;
- Implementation of action plans to address potential or confirmed exposure levels that exceed reference occupational exposure levels developed by international organizations such as the (ICNIRP), and the Institute of Electrical and Electronics Engineers (IEEE). Action plans to address occupational exposure may include limiting exposure time through work rotation, increasing the distance between the source and the worker, when feasible, or the use of shielding materials.

Exposure to chemicals

- Train personnel on how to use pesticides applied to wooden pole for preservation, and ensure that personnel have received the necessary certifications, or equivalent training where such certifications are not required;
- Respect post-treatment intervals to avoid operator exposure during wooden pole handling;
- Ensure hygiene practices are followed to avoid exposure of family members to pesticides residues.

3. Community Health and Safety guidelines

The operation of live power distribution lines and substations may generate the following industry-specific impacts to the community: Electrocution; Electromagnetic interference; Visual amenity; Noise and Ozone and Aircraft Navigation Safety

Electrocution

- Use of signs, barriers (e.g. locks on doors, use of gates, use of steel posts surrounding transmission towers, particularly in urban areas), and education / public outreach to prevent public contact with potentially dangerous equipment;
- Grounding conducting objects (e.g. fences or other metallic structures) installed near power lines, to prevent shock.

Noise and Ozone

- To mitigate this impact during project planning stages to locate rights-of-way away from human receptors to the extent possible and use of noise barriers or noise cancelling acoustic devices should be considered as necessary.

4. Performance Indicators and Monitoring

Environment: Environmental monitoring activities should be based on direct or indirect indicators of emissions, effluents, and resource use applicable to the particular project. Monitoring frequency should be sufficient to provide representative data for the parameter being monitored. Monitoring data should be analysed and reviewed at regular intervals and compared with the operating standards so that any necessary corrective actions can be taken. **Occupational Health and Safety**: Projects should try to reduce the number of accidents among project workers (whether directly employed or subcontracted) to a rate of zero, especially accidents that could result in lost work time, different levels of disability, or even fatalities. Facility rates may be benchmarked against the performance of facilities in this sector in developed countries through consultation with published sources. Facilities should also maintain a record of occupational accidents and diseases and dangerous occurrences and accidents.

Appendix 7: Indicative contents of waste management plan

The waste management plan will be an integral part of the C-ESMP and will be developed consistent with World Bank ESF and WB EHSG and General Electric Power Transmission and Disribution).

- Introduction: Here the contractor should provide the executive summary on waste management and the relevancy to the project Component.
- A review and analysis of national and institutional policy and legislation related to waste
- A description of National legal, policy and procedures in relation to waste management
- A description of the general types and an indication of likely quantities of waste likely to be generated by the proposed development;
- Waste Management Principles; These principles, with the procedures above, will form the basis of the waste management Plan including the used solar panels and batteries. The contractor should discuss in detail the way to
    - Minimize,
    - Reuse,
    - Recycle,
    - Disposal and recover.
- Waste management implementation plan and institutional arrangement: In this section the contractor should discuss in detail how the waste management will be implemented focusing mainly on the way to:
    - Collect waste;
    - Storage of waste
    - Waste transportation
    - Waste disposal

He should also discuss an arrangement showing how he will be working with Local Government Officials and Local population to access to produced waste especially waste concerning the used solar home system including used panels and batteries at the end of life.
The implementation arrangement should also show the need to work with certified company for electronic waste management where the contract for collection, transportation and disposal is mandatory and a pre-requisite requirement for being awarded a contract to work in the area of Off Grid intensification in Rwanda for the ASCENT.

Appendix 8: Hazardous Substance Management Plan

This plan is constituted based on the regulations governing the provision of services for Hazardous waste management in Rwanda established by RURA which can be accessed on (https://www.rura.rw/fileadmin/Documents/Water/RegulationsGuidelines/Regulations_governing_the_provision_of_services_for_Hazardous_waste_management.pdf).

Generation of Hazardous Waste

Any company, individual or a group of people working under the power lines and electrical infrastructure should strive to avoid, reduce, minimize or recover the waste generated and make sure that the safe disposal is done.
The generator of hazardous waste shall ensure that hazardous waste is segregated from other wastes to avoid any harm to the environment and the community.

Segregation of Hazardous waste

The segregation of hazardous waste must meet the following requirements:

- All hazardous waste must be segregated according to their nature to prevent incompatible mixtures.
- The segregation can be by hazard class such as flammable, oxidizer, pyrophoric, reactive, reducer, acid, base, and Toxic.

Packing material for hazardous waste

The packing materials of hazardous waste shall be of the following conditions:

- Inert and not react with hazardous waste;
- Able to absorb impact;

The materials which can be used include steel, aluminum, Natural Wood, Plywood, reconstituted wood, plastic materials.

Types of containers for hazardous waste packing

The types of containers applicable for packing hazardous waste include the following types Bags, Drums,, jerrycans, combination packaging, composite packaging etc.

Packaging of hazardous waste

The containers used for packaging hazardous waste shall be able to withstand normal handling conditions and retain integrity for at least six months must meet the following requirements:

- All packaging materials shall be of such strength, construction and type that would not break or become defective during transportation;
- All packaging material shall be packaged and sealed in such a way that those spillages of hazardous wastes/substances are prevented during transportation due to jerks and vibrations caused by uneven road surface;
- Re-packaging materials including that used for fastening must not be affected by the contents or form a dangerous combination with them;

Packaging material shall be such that there will be no significant chemical or galvanic action among any of the material in the package.

Labelling of Hazardous waste

All hazardous waste containers must be clearly labeled to indicate the presence of hazardous waste. The labels must be waterproof and firmly stuck to the containers so that they cannot be removed. Containers storing hazardous waste shall be labeled with the words “HAZARDOUS WASTE, IMYANDA IHUMANYA or DECHETS DANGEREUX” or warning or caution statements such as “WARNING” or “CAUTION”.
The information on the label must include the type of waste, origin (name, address, telephone number og generator), hazardous property (flammable, toxic, etc.) and any symbol for the hazardous property.

Collection of Hazardous Waste

Any generator of hazardous waste shall ensure that hazardous wastes generated are collected in an appropriate manner and by an authorized person, company or cooperative. The personnel collecting hazardous waste must have personal Protective Equipment to avoid any physical contact with the waste.

Requirements for hazardous waste collection and transportation

Any company or cooperative intending to collect and transport waste shall fulfill the following requirements:

- Have appropriate vehicles designed to facilitate the collection, transportation and removal of hazardous waste;
- Have a signed contract with the owner of the receiving hazardous waste for treatment.

Transportation of hazardous waste

The transportation of hazardous wastes shall confirm with the following requirements:

- Hazardous waste shall be collected and transported by duly designed vehicles to transport hazardous waste;
- Vehicles shall be painted preferably in a color that is easy to facilitate identification of the transportation of hazardous waste.
- The transportation vehicles and containers shall be suitably designed to transport hazardous waste and must be fully closed all times.
- Vehicle should be fitted with mechanical handling equipment for safe handling and transportation of hazardous wastes and structurally sound and leak free to avoid contamination of local environment;
- The words “HAZARDOUS WASTE, IMYANDA IHUMANYA or DECHETS DANGEREUX” shall be displayed on all sides of the vehicle to easily identify the vehicle;
- Transporter shall carry documents of manifest for the wastes during transportation;
- The trucks shall be dedicated for transportation of hazardous wastes ONLY and shall not be used for any other purposes;
- Each vehicle shall carry first-aid kit, spill control equipment and fire extinguisher;
- Vehicles transporting hazardous waste shall have a speed governor installation system to avoid any eventuality of over-speeding during the transportation of hazardous waste;
- Driver(s) shall be properly trained for handling the emergency situations and safety aspects involved in the transportation of hazardous wastes.

Storage Facilities for hazardous waste

The storage of hazardous waste before treatment shall be handled with extreme care to avoid any contamination or hazard and the following are requirements pertaining to the storage of hazardous waste facilities:

- The storage area shall have a proper containment system with a collection area to collect and remove any leak, spill or precipitation;
- The designated hazardous waste storage area shall have proper enclosures, safety and avoid open storage;
- Signboards showing precautionary measures to be taken in case of normal and emergency situations shall be displayed at appropriate locations;
- Manual operations within storage area are to be avoided to the extent possible;
- Proper precautions need to be taken in case of personnel use particularly during loading/unloading of hazardous waste.

Treatment of hazardous waste

Any person that provide or intend to provide the services of hazardous waste treatment shall treat or cause to be treated such hazardous waste and shall operate under a license to provide such services.
Any products treated shall be disposed or treated in accordance with the conditions set by the competent authority in consultation with the concerned stakeholders.

Safe working conditions

To provider of services for treating hazardous waste shall ensure the safety of employees, visitors and other users within the safe working conditions and shall confirm to the following:

- Possess hazard warning signs including multilingual signs together with appropriate information regarding remedial action;

- Provide adequate safety and protective Equipment (Masks, Safety shoes, eye protection gadgets, gumboots, and other safety equipment) to employees involved in waste collection, transportation and handling;
- Provide instructions and appropriate trainings to employees to minimize the risks;
- Provide social and medical insurance to employees to ensure treatment during, accident, illness or injury;
- Provide risk prevention and management facilities;

Appendix 9: Public Consultation and Stakeholder Engagement Strategy

Developing a robust public consultation and stakeholder engagement strategy is essential for organizations and projects that aim to involve the public and stakeholders in decision-making processes and gather valuable input. Below are the key steps and considerations that will be used to create an effective strategy throughout project implementation:

a) **Define Objectives and Scope**:
   - Clearly outline the goals and objectives of the consultation and engagement process. Determine what you want to achieve, whether it's gathering input, building trust, or informing the public.

b) **Identify Stakeholders**:
   - Identify all relevant stakeholders who may be affected by or have an interest in the project or initiative. This can include community members, local authorities, NGOs, industry groups, and more.

c) **Stakeholder Analysis**:
   - Conduct a comprehensive stakeholder analysis to understand each stakeholder's interests, concerns, influence, and communication preferences. Categorize stakeholders based on their level of impact and importance to the project.

d) **Legal and Ethical Considerations**:
   - Ensure compliance with legal requirements and ethical standards for public consultation and engagement. This may include data privacy regulations and guidelines for fair and transparent processes.

e) **Select Engagement Methods**:
   - Choose appropriate methods and channels for engagement, considering the preferences and accessibility of stakeholders. Methods can include public meetings, surveys, focus groups, online platforms, workshops, and one-on-one consultations.

f) **Develop a Communication Plan**:
   - Create a communication plan that outlines the key messages, communication channels, and the timing of engagement activities. Ensure consistency and clarity in messaging.

g) **Engagement Toolkit**:
   - Prepare engagement materials and tools, such as informational brochures, websites, surveys, and presentation materials, to facilitate communication with stakeholders.

h) **Public Meetings and Workshops**:
   - Plan and organize public meetings, workshops, or town halls to provide stakeholders with opportunities to ask questions, express concerns, and provide feedback. Ensure that meetings are accessible and inclusive.

i) **Online Engagement**:
   - Establish online platforms, such as websites, social media accounts, and online surveys, to engage with a wider audience, especially those who may not be able to attend physical meetings.

j) **Feedback Collection and Analysis**:
   - Systematically collect and analyze feedback from stakeholders. Use tools to track and manage responses, categorize feedback, and identify common themes and concerns.

k) **Responsive and Transparent Communication**:
   - Communicate responses to stakeholder feedback promptly and transparently. Clarify how feedback influenced decisions and actions taken.

l) **Adapt and Iterate**:
   - Be prepared to adapt your strategy based on feedback and evolving stakeholder needs. Continuously evaluate and improve your engagement approach.

m) **Documentation and Reporting**:
   - Document the entire engagement process, including feedback received, actions taken, and outcomes achieved. Prepare regular reports summarizing engagement activities and outcomes.

n) **Monitoring and Evaluation**:
   - Establish key performance indicators (KPIs) to measure the effectiveness of your engagement efforts. Evaluate whether objectives were met and identify areas for improvement.

o) **Feedback Loop**:
   - Create a feedback loop to ensure that stakeholders are kept informed about project developments, decisions, and outcomes, even after the consultation process has concluded.

p) **Engagement Resources**:
   - Allocate sufficient resources, including staff and budget, to support the consultation and engagement process effectively.

q) **Engagement Culture**:
   - Foster an organizational culture that values stakeholder engagement and recognizes its importance in decision-making.

r) **Publicize Results**:
   - Share the results of the engagement process with the public and stakeholders, showcasing how their input influenced decisions and contributed to project outcomes.

Appendix 10: Prevention of GBV, Sexual Harassment, Exploitation, and Abuse Plan

❖ Introduction

Sexual harassment is a violation of human rights and hinders productivity within an institution/organization. Sexual harassment can also lead to other criminal acts such as rape. Sexual harassment and exploitation are also degrading, embarrassing, and may lead to traumatic experiences. Staff members who experience sexual harassment may feel threatened, scared, isolated and/or alone.

It creates psychological anxiety and stress for victims, which can result in loss of productivity (decline in staff performance), low worker morale, absenteeism, and staff turnover. Sexual harassment and exploitation most often occur in relationships of unequal power or authority It undermines equality at the workplace by calling into question the integrity, dignity, and wellbeing of workers.

As a prevention and response to GBV, sexual harassment, exploitation, and abuse and in line with the Government of Rwanda's (GoR) commitment to the protection of human dignity and integrity, and based on national laws, regulations, and policies, a gender and GBV/SHAE action plan which highlights the expected behaviors, prohibitions, prevention measures, as well as the reporting and response mechanisms/procedures will be developed. The GBV Action Plan will be developed to provide enough details and establish procedures of handling cases as part of the service providers mapping. The bidding documents will clearly define GBV requirements.

❖ Prevention measures/strategies

In the framework of preventing and/or minimizing the risks of sexual harassment, exploitation, and abuse in the world of work, measures such as raise awareness about the plan of preventing the sexual harassment, exploitation in different periodic meetings, signing official form as a personal acknowledgement of the plan, availing in place a safe reporting mechanism, including anonymous channels such anonymous web-based mail service etc.

❖ Trainings on anti-GBV

Trainings on anti-GBV Anti GBV related preventive measures and responses will be established, adopted and strengthened through the trainings organized to project Staff and concerned stakeholders. In order to properly address GBV/SEA & SH, the trainings and sensitization campaigns of workers are essential. These workers include civil works contractors (including subcontractors and suppliers and their workers), supervising Engineers, consultants who may have a presence in the communities adjoining the project.

❖ Expected/ Prohibited behaviors

In the framework of preventing and effectively responding to any incident or concern of sexual harassment, exploitation, and abuse, a non-exhaustive list of expected/prohibited behaviors will be defined in the anti GBV Sexual harassment plan which will be developed through the anti GBV/SHAE plan.

❖ Responsive measures

Provision of comprehensive support services to GBV victims will be essential that project-level measures to address GBV risks consider other ongoing efforts to prevent and respond to GBV, and how the project will complement/use them. Project GBV interventions shall therefore be linked wherever possible with existing activities in the Health Sector, and other GBV Service Providers such as Local Administration; Justice/Security, Psychosocial support and Economic empowerment programming.

❖ Reporting

finding evidence for GBV, sexual harassment, exploitation, and/or abuse may be challenging as such acts and/or behaviors usually occur in private. However, considering the critical importance of reporting in addressing sexual harassment, exploitation, and abuse, including preventing future reoccurrence of such acts or behaviors, anyone can raise a complaint even if he or she has no evidence other than his or her own experience. Reporting is not only meant for pursuing the alleged offender, but also guides the general corrective measures and to prevent any reoccurrence of such a situation and/or incident in the future. Early reporting and intervention have proven to be the most effective method of resolving actual or perceived concern/incidences of sexual harassment, exploitation, and abuse, reason why it will be encouraged. The following format will be used as a

GBV/SEA reporting format.

*Table 27: **GBV/SEA Reporting template***

S/N	INCIDENT DETAILS	GUIDING NOTES
1	Type of Violation (e.g.: physical, economic, sexual, psychological violence).	SEA/SH (by Client rules and regulation, ethics consideration, contractor staff)
2	Nature of the incident reported (What happened and by whom).	Basic facts of the incident: What, Who. Is the incident related to the project? No in-depth details should be asked for.
3	Source of information.	Community Focal Point, GRM Operator, email, other (specify)
4	Where did the incident occur.	Project site City, elsewhere (specify)
5	When did the incident occur.	Date
6	Additional information (if available).	Sex, Age
	The identity and safety of a Victim must be protected at all times. No personal data or identifying information about a survivor or their experience can be shared through this document. Personal/identifying information includes the victim's name, perpetrator(s)' name, date of birth, home address, the exact time and place the incident took place, visible disability, residence status.	

*Table 28**: GBV/SEA Training Plan***

S/N	Target group	Topics to be covered	Frequency	Modality	Indicators	Budget
1	Relevant technical staff from implementing agencies.	Understanding of GBV/SEA & SH and how Project can exacerbate GBV/SEA & SH risks, Psychosocial support for survivors of GBV/SEA & SH	Annual	Official workshop organized and delivered by EDCL/ ASCENT	Report on the training with participants and content delivered, gaps and recommendations for next training sessions	Covered in the project cost
2	Management at central and local level including District Engineers.	Roles and responsibilities of actors involved in the Project (the standards of conduct for project staff captured in Codes of Conduct)	Annual	Official workshop organized and delivered by EDCL/ ASCENT	Report on the training with participants and content delivered, gaps and recommendations for next training sessions	Covered in the project cost
3	District Gender and Family Promotion Officer.	GBV/SEA & SH allegation reporting mechanism, accountability structures, and referral procedures within agencies and for community members to report cases related to project staff;	Annual	Official workshop organized and delivered by EDCL/ ASCENT	Report on the training with participants and content delivered, gaps and recommendations for next training sessions	Covered in the project cost

S/N	Target group	Topics to be covered	Frequency	Modality	Indicators	Budget
4	Grievance Redress Management (GRMs).	Services available for victims of GBV; and follow-up activities to reinforce training contents	Annual	Official workshop organized and delivered by EDCL/ ASCENT		
5	Civil works contractors' unskilled or casual workers • Subcontractors, • Suppliers and their workers.	Understanding of GBV/SEA & SH and how Project can exacerbate GBV/SEA & SH risks, Psychosocial support for survivors of GBV/SEA & SH, Roles and responsibilities of actors involved in the Project, GBV/SEA & SH cases/allegation reporting mechanism	Quarterly	Seminars organized and delivered by implementing agencies in close collaboration with EDCL/ ASCENT	Number of seminars with participants and content delivered, gaps and recommendations for future seminars.	Covered in the project cost
6	Communities adjoining the project site Men, women and youth (boys and girls), PWDs and elderly persons to be resettled in the green villages.	Understanding of GBV/SEA & SH and how Project can exacerbate GBV/SEA & SH risks, Psychosocial support for survivors of GBV/SEA & SH, Roles and responsibilities of actors involved in the Project, GBV/SEA & SH cases/allegation reporting mechanism.	Quarterly	Seminars organized and delivered by implementing agencies in close collaboration with EDCL/ ASCENT	Number of training workshops conducted, participants and content delivered, gaps and recommendations for future training sessions.	Covered in the project cost.

Appendix 11: Standardized Incident reporting format

INCIDENT REPORT FORMAT

To be completed by the contractor staff within 24 hours of incident/accident

Incident date: …….Incident Time: ……

Incident's place (District, Sector, Cell, Village: …….

Injured/dead person name: …….

Address: ……

Phone number: …….

Male/Female:……..Date of Birth

Incident category:

Category 1: "Minor or negligible, no one was injured"

Category 2: Moderate, injuries with short term impairement

Category 3: Critical/ major, susceptible to lead to serious illness or death

Details of incident:

……
…
……
……
……

Who was injured person?: ……

Injury type: ……

Does injury require hospital/Physician?. Yes: ……No: …….

Hospital name: ……

Address: ……

Hospital phone number: …….

Injured person/party signature/ date: ……/…….

Important notes / instructions

……
……
……

Prepared by: ……, Signature: ……..Date and time: …….
Approved by: *……., Signature: ……., Date and time: ……*

Appendix 12**: Contractor's Code of Conduct**

Implementing Environmental, Social Health and Safety (ESHS) and Occupational Health and Safety (OHS) Standards Preventing Gender -Based Violence (GBV) and Violence Against Children (VAC)

(Name of contractor) acknowledges that adhering to environmental, social health and safety (ESHS) standards, following the project's occupational health and safety (OHS) requirements, and preventing gender-based violence (GBV) and violence against children (VAC) is important. All forms of GBV or VAC are unacceptable, be it on the work site, the work site surroundings, at material storage and personnel storage area, or the surrounding communities.

The company considers that failure to follow ESHS and OHS standards, or to partake in GBV or VAC activities, constitute acts of gross misconduct and are therefore grounds for sanctions, penalties or potential termination of employment. Prosecution of those who commit GBV or VAC may be pursued if appropriate.

(Name of contractor) agrees that while working on the project every employee will:

- Attend and actively partake in training courses related to ESHS, OHS, HIV/AIDS, GBV and VAC as requested by employer.
- Shall wear personal protective equipment (PPE), in the correct prescribed manner, at all times when at the work site or engaged in project related activities.
- Take all practical steps to implement the organization's environmental and social management plan (CESMP).
- Implement the OHS Management Plan.
- Adhere to a zero-alcohol policy during work activities, and refrain from the use of illegal substances at all times.
- Consent to a police background check.
- Treat women, children (persons under the age of 18), and men with respect regardless of race, color, language, religion, political or other opinion, national, ethnic or social origin, property, disability, birth or other status.
- Not use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate.
- Not participate in sexual contact or activity with children—including grooming or contact through digital media. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense or excuse.
- Not engage in sexual harassment—for instance, making unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct, of a sexual nature, including subtle acts of such behavior. Ex. Looking somebody up and down; kissing, howling or smacking sounds; hanging around somebody; whistling and catcalls; giving personal gifts; making comments about somebody's sex life; etc.
- Not engage in sexual favors—for instance, making promises or favorable treatment dependent on sexual acts—or other forms of humiliating, degrading or exploitative behavior.

- Unless there is the full consent[6] by all parties involved, every worker shall not have sexual interactions with members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to community members in exchange for sex—such sexual activity is considered "non-consensual" within the scope of this Code.
- Consider reporting through the GRM (Grievance Redress Mechanism) or to the manager any suspected or actual GBV or VAC by a fellow worker, whether employed by my employer or not, or any breaches of this Code of Conduct.

Quality of products and services

(Name of the contractor) expects that products and services provided by each sub-Contractor will be of the highest quality and will be fairly and reasonably priced so that ***(Name of the contractor)*** customers are served with the best value. In addition to any specific requirements in the agreement with ***(Name of the contractor)***, products and services will meet or exceed applicable government standards, including environmental and safety standards.

Health and Safety

(Name of the contractor) is dedicated to providing safe, injury-free working conditions and a healthy work environment. Compliance with this commitment is a condition of any sub-Contractor engagement with ***(Name of the contractor)***.

Workplace safety

Each Sub-Contractor is responsible for ensuring that its Representatives complete all necessary safety training and per formwork in conformance with all applicable safety rules, laws, standards and procedures and for complying with and enforcing any additional ***(Name of the contractor)*** safety policies and procedures communicated to Sub-Contractor.

Reporting injuries, damage and unsafe conditions

In addition to any other legal reporting requirements, ***(Name of the contractor)*** and each Contractor must immediately report any occupational injuries, unsafe conditions or practices and damage to property occurring as a result of the ***(Name of the contractor)/Sub-Contractor*** or its Representative's activities to REG or any deserved entity.

Alcohol and drug use

(Name of the contractor)'s commitment to providing a healthy and safe working environment is compromised by the consumption of alcohol and illegal drugs. While performing work for ***(Name of the contractor)***, Employees, Sub-Contractors and Representatives must not consume, use or be impaired by alcohol or illegal drugs or be under the influence of prescription drugs that impair a person's ability to perform work in a safe and efficient manner.

Workplace violence

Acts or threats of physical violence, intimidation and harassment will not be tolerated. Engaging in violence or threatening or intimidating behavior may result in termination of the contract with ***(Name of the contractor)*** or removal of the Representative from ***(Name of the contractor)*** property, as deemed appropriate by ***(Name of the contractor)***.

The Environment

REG is committed to conducting its business in an environmentally responsible manner. ***(Name of Contractor)*** and Representatives will comply with all applicable environmental laws and regulations and operate in a way that minimize the negative environmental impact of the products and services.

Ethics

(Name of Contractor) must operate within the highest standards of ethical conduct when dealing with REG, Representatives, REG employees, customers and the public. ***(Name of Contractor)*** will ensure that its actions, and those of its Representatives, comply with the letter and spirit of this Code.

Anti-corruption

(name of contractor) and Representatives are committed to zero tolerance against corruption and shall not engage in any form of bribery, extortion, embezzlement or other corrupt practices.

Fair competition

When conducting works ***(Name of Contractor)*** and Representatives shall uphold fair standards in recruiting and competition.

Confidentiality

Confidential information includes information that is not known by the public and that may be harmful to the organization, its employees or its customers if disclosed***. (Name of the Contractor)*** is committed to safeguarding and protecting its own confidential information and the personal information of its customers and employees. Sub-Contractor must maintain the confidentiality of information entrusted to it in accordance with its agreements with (***Name of the Company***) and applicable law. The obligation to protect (***Name of the Company***)'s confidential information continues even after the business relationship with (***Name of the Company***) ends.

[6] **Consent** is defined as the informed choice underlying an individual's free and voluntary intention, acceptance or agreement to do something. No consent can be found when such acceptance or agreement is obtained through the use of threats, force or other forms of coercion, abduction, fraud, deception, or misrepresentation. In accordance with the United Nations Convention on the Rights of the Child, the World Bank considers that consent cannot be given by children under the age of 18, even in the event that national legislation of the country into which the Code of Conduct is introduced has a lower age. Mistaken belief regarding the age of the child and consent from the child is not a defense.

Updates to Code and Disclaimer

(Name of the Contractor) reserves the right to amend and modify this Contractor Code of Conduct at its discretion. The provisions of the Code are not intended to change any obligations set forth in the Contractor's agreement with REG and in the event of any conflict, the terms in the agreement with REG will prevail.

Appendix 13: Individual code of conduct

Implementing Environmental, Social Health and Safety (ESHS) and Occupational Health and Safety (OHS) Standards
Sexual Exploitation and Abuse (SEA), Sexual Harassment (SH) and Violence against Children (VAC)

I, _____, acknowledge that sexual exploitation and abuse (SEA), sexual harassment (SH), Violence against Children (VAC) and other unethical behaviors are prohibited at workplace, while adhering to Environmental, Social Health and Safety (ESHS) standards and following the project's Occupational Health and Safety (OHS) requirements is a must at workplace. As an employee of Village ……..; Cell ……..…….……Sector; ……..…..District……. in Rwanda, I acknowledge that sexual exploitation and abuse (SEA),sexual harassment (SH), violence against children (VAC) and other unethical activities, not adhering to Environmental, Social, Health and Safety (ESHS) standards and not following the project's Occupational Health and Safety(OHS) requirements on the work site, the work site surroundings, or the surrounding community constitute a violation of this *Code of Conduct*. I understand SEA, SH, VAC and other unethical activities, not adhering to ESHS standards and not following OHS requirements are grounds for sanctions, penalties or potential termination of employment. I pledge not to commit SEA, SH, VAC or other unethical offense, otherwise I will undergo the above punishments, including being pursued by prosecution.

I agree that while working on the project, I will:

- Treat all persons, including children (persons under the age of 18), with respect regardless of sex, race, color, language, religion, political or other opinion, national, ethnic or social origin, gender identity, sexual orientation, property, disability, birth or other status.
- Commit to creating an environment which prevents SEA, SH, VAC and unethical practices and promotes this code of conduct. In particular, I will seek to support the systems which maintain this environment.
- **Not** participate in SEA, SH, VAC and other unethical activities as defined by this *Code of Conduct* and as defined under Rwandan law.
- **Not** use language or behavior towards women, children or men that is inappropriate, harassing, abusive, sexually provocative, demeaning or culturally inappropriate;
- **Not** participate in sexual contact or activity with anyone below the age of 18. Mistaken belief regarding the age of a child is not a defense. Consent from the child is also not a defense. I will not participate in actions intended to build a relationship with a minor that will lead to sexual activity.
- **Not** solicit/engage in sexual favors in exchange for anything as described above;
- Unless there is the full consent by all parties involved, recognizing that a child is unable to give consent and a child is anyone under the age of 18, I will not have sexual interactions with coworkers or any members of the surrounding communities. This includes relationships involving the withholding or promise of actual provision of benefit (monetary or non-monetary) to coworkers or community members in exchange for sex—such sexual activity is considered "non-consensual" under this Code;
- Reveal any case related to hiring children for domestic or other labor which is inappropriate given their age or developmental stage, which interferes with their time available for education and recreational activities, or which places them at significant risk of injury;
- Always wear my personal protective equipment (PPE), in the correct prescribed manner, at all times when at the work site or engaged in project related activities;
- Take all practical steps requiring employee compliance and adherence to implement the contractor's environmental and social management plan (CESMP) and any relevant instructions which will be provided by the employer in relation to Environmental and Social Risk Management requirements;
- **Not** manifest any kind of robbery or theft of any kind at the workplace;
- Fully observe the principle of honesty, integrity, fair play and mutual respect at work;
- Avoid soliciting or accepting any advantage from any persons to in turn secure ineligible benefits of any kind from the project;
- Avoid using the employment position or any information made available to me in the course of my duties for not deserved personal gains or gains of any other persons;
- Ensure proper use, maintenance, safety and security of site property and materials;
- Always possess at my disposal a valid personal Health Insurance during employment period;
- Not be indulged in any form of interpersonal conflict such as fighting, insults, abuse of any sort, etc.
- Observe working hours, avoid absenteeism without genuine reasons and fully work as required

I commit to:

- Adhere to the provisions of this code of conduct both on and off the project site.
- Attend and actively partake in training courses related to preventing SEA, SH and other unethical practices as requested by my employer.

If I am aware of or suspect SEA, SH and any other unethical practice, at the project site or surrounding community, I understand that I am encouraged

to report it to the Grievance Redress Committee (GRM) for case proper follow up and handling. The safety, consent, and consequences for the person who has suffered the abuse will be part of my consideration when reporting. I understand that I will be expected to maintain confidentiality on any matters related to the incident to protect the privacy and security of all those involved.

Sanctions: I understand that if I breach this Individual Code of Conduct, my employer will take disciplinary actions which could include:

- Informal (verbal) warning or formal warning;
- Additional training;
- Deduction from the salary;
- Loss of payment;
- Suspension of employment (with or without payment of worked days);
- Termination of employment contract;
- Report to the Rwanda National Police (RNP) or Rwanda Investigation Bureau (RIB) or other authorities as warranted.

I understand that it is my responsibility to adhere to this code of conduct. That I will avoid actions or behaviors that could be construed as SEA, SH, VAC and unethical practices. I will avoid any activity that could hinder the implementation of Environmental, Social, Health and Safety (ESHS) standards and Occupational Health and Safety (OHS) requirements Any such actions will be a breach to this Individual Code of Conduct. I acknowledge that I have read the Individual Code of Conduct, do agree to comply with the standards contained in this document, and understand my roles and responsibilities to prevent and potentially report SEA, SH, VAC and other unethical issues, environmental damage, health and safety problems. I understand that any action inconsistent with this Individual Code of Conduct or failure to act mandated by this Individual Code of Conduct may result in disciplinary action and may affect my employment.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

Appendix 14: Air Quality Parameter

Pollutants in the form of gaseous and particulate substances are air quality pollutant parameters which are released in excess into the atmospheres that cause air pollution as well as degrading the quality of the air when subjected to the index and standard according to the Environmental Protection Agency air permissible standard (**Environmental Protection Agency (EPA) (2010) Climate Change Indicators in the United States. Environmental Protection Agency, Washington DC, 70-77**). The imbalance of the atmosphere is a result of the gaseous and particulate matter released into the atmosphere in the form of pollutants. When these pollutants are released into the globe (atmosphere, lithosphere, and hydrosphere) through anthropogenic activities due to the high increase in pollution uncontrolled and technological advancement, it results in three different kinds of environmental pollution formed, due to the fact that the air quality has been altered, degraded and tempered with air quality parameters, that leads to air pollution. Air pollution sources result from different gaseous emissions or the release mainly from the industries, thermal power stations, automobiles, household's fuel, etc. are accumulated gaseous chemical substances in the atmosphere condenses due to a mixture of rainfall with other parameters released in the form of Sulphur (iv) oxide, Carbon dioxide, and other greenhouse gases (SO_2, CO_2, Cl_2, etc.) into the atmosphere from different activities which results in acid rain, and falls back to the land/soil as well as water bodies, hence land and water pollution is formed. Selected qualities of air measurement parameters in this project are air quality index which is written as AQI. It is measured in microgram per meter cube. Carbon monoxide in limited supply and carbon dioxide excess supply during the chemical reaction of hydrocarbons in the industries, which are written as CO, NO_2, O_3, SO_2, Ammonia Gas (NH_3), and particulate matter (PM_{10} & $PM_{2.5}$), Nitrogen Mono Oxide (NO), are not detected throughout the sampling period. The quality of air pollution can easily be determined in a workplace according to [Jang, H. (2016) Identifying 21st Century STEM Competencies Using Workplace Data. Journal of Science Education and Technology, 25, 284-301. https://doi.org/10.1007/s10956-015-9593-1]. The air meter is used to detect the levels of air quality parameters present in the project area, with help of different color detection. Sometimes when green is detected, it showed that the quality of air is good, excellent indicating that such ecosystem is green vegetation, meaning air quality pollutants free, regarding the parameter indicated, yellow color shows fair or moderate air quality as shown in the figure below.

Air color	Concern levels	Classes	Index values	Air quality description
Green	Good	1	0 - 50	Satisfactory air quality. Air pollution here, pose little or no risk.
Yellow color	Fair/Moderate	2	51 - 100	Acceptable air quality. This category may pose risk for some people, especially those who are usually prone to air pollution.
Orange color	This group is concerned with unhealthy health issues for some sensitive people.	3	101 - 150	Pollutant levels here, members of people in this category are affected due to the sensitive health effects experience by the general public health.
Red color	Concern levels for people is not healthy.	4	151 - 200	Some members of people in this group where the pollutants indicate red color, the general public may experience health effect that some sensitive member may experience very serious health effects.
Purple color	People in this category are very unhealthy.	5	201 - 300	Here, everyone experience the risk of health effects alert.
Maroon color	Hazardous	6	301 an above	Everyone here, are likely to be affected due to health emergency warning condition alert.

Figure 14: Description of air color and air quality

Source: Environmental Air Quality Parameters Monitory Information Assessments and Its Health Implications on Biotic Factors in Banjul Metropolis, The Gambia, March 2024

Air quality index

AQI Category	Description
Good	Good air quality
moderate	Acceptable air quality. Except for people unusually sensitive to air pollution
USG Unhealth for Sensitive Group	Sensitive groups may experience health effects
Unhealthy	Everyone may experience health effects. More serious for sensitive group
Very Unhealthy	Health alert: Everyone may experience more

Figure 15: Air Quality Index Rwanda.

Source: air quality in Rwanda levels, impacts, way forward, June 2019

Annex 1: Potable water quality

Sl. No.	Parameter	Limit		Test method
		Treated potable water	Natural potable water	
a)	Colour, TCU[a], max.	15	50	ISO 7887
b)	Turbidity, NTU, max.	5	25	ISO 7027
c)	pH	6.5 – 8.5	5.5 - 9.5	ISO 10523
d)	Conductivity, µS/cm, max.	1500	2500	ISO 7888
e)	Suspended matter, mg/l	Not detectable	Not detectable	ISO 11923
f)	Total dissolved solids, mg/l, max.	1000	1500	ASTM D 5907-13
g)	Total hardness, as $CaCO_3$, mg/l, max.	300	600	ISO 6059
h)	Aluminium, (Al), mg/l, max.	0.2	0.2	ISO 12020
i)	Chloride, (Cl), mg/l, max.	250	250	ISO 9297
j)	Total Iron (Fe), mg/l, max.	0.3	0.3	ISO 6332
k)	Sodium, (Na), mg/l, max.	200	200	ISO 9964
l)	Sulphate (SO_4), mg/l, max.	400	400	ISO 10304-1
m)	Zinc (Zn), mg/l, max.	5	5	ISO 8288
n)	Magnesium, (Mg), mg/l, max.	100	100	ISO 7980
o)	Calcium, (Ca), mg/l, max.	150	150	ISO 7980
p)	Potassium (K), mg/l, max.	50	50	ISO 9964

[a] True colour units (TCU) mean hazen units after filtration.

Figure 16: Physico-chemical requirements for potable wate.

Source: IWRM Program Rwanda Water quality monitoring in Rwanda phase II final report (February – March 2019)

Appendix 15: Discharged Water Quality

	Parameter	Permissible limits
1	Temperature increase (°C)	<3
2	Total suspended solids (mg/l)	50.0
3	Total Dissolved Solids (mg/l)	2000.0
4	Oil and grease (mg/l)	10.0
5	BOD_5 (mg/l) (20°C)	50.0
6	COD (mg/l)	250.0
7	Faecal Coliforms (MPN/100ml)	400
8	Ammonia (as N) (mg/l)	20.0
9	Arsenic (mg/l)	0.01
10	Benzine (mg/l)	0.1
11	Cadmium (mg/l)	0.01
12	Hexavalent Chromium (mg/l)	0.05
13	Copper (mg/l)	3.0
14	Cyanide (mg/l)	0.1
15	Iron (mg/l)	3.5
16	Lead (mg/l)	0.1
17	Mercury (mg/l)	0.0002
18	Nickel (mg/l)	3.0
19	Phenol (mg/l)	0.2
20	Sulphide (mg/l)	1.0
21	Zinc (mg/l)	5.0
22	pH	5-9

The total amount of heavy metals shall not exceed 10.0 mg/l

Figure 17: Discharged standards for industrial effluents into water bodies maximum permissible limits (EAS, 2012)

Appendix 16: Noise parameters, Tolerable limits for Noise

Area Code	Category of area	Limit in dB, Max.	
		Day time	Night time
A	Industrial Area	75	70
B	Commercial Area	65	55
C	Residential area	55	45
D	Silence Zone	50	40

Figure 18: Ambient air quality standards in respect of noise.

Source: Acoustics — Noise pollution — Tolerance limits, Rwanda Standards Board, July 2014.

S/No	Type of building	Maximum acceptable noise levels (dB)
1	Offices	50 - 60
2	Dwellings(Houses and Flats)	45 - 55
3	Schools(Classrooms or lecture rooms)	45 - 50
4	Hospitals	40 - 50

Figure 19: Maximum acceptable noise levels inside buildings.

Source: Acoustics — Noise pollution — Tolerance limits, Rwanda Standards Board, July 2014

Noise level (dBA)	Maximum exposure time per 24 h
85	8 h
88	4 h
91	2 h
94	1 h
97	30 min
100	15 min
103	7.5 min
106	3.7 min
109	112 sec
112	56 sec
115	28 sec
118	14 sec
121	7 sec
124	3 sec
127	1 sec
130 – 140	less than 1 sec
140	NO EXPOSURE

Figure 20: Maximum recommended noise dose — Exposure levels.

Source: Acoustics — Noise pollution — Tolerance limits, Rwanda Standards Board, July 2014