ENVIRONMENTAL, SOCIAL AND HEALTH IMPACT ASSESSMENT (ESHIA) OF THE THE SIERRA RUTILE SEMBEHUN HAUL ROAD, BRIDGE AND TRANSMISSION LINE PROJECT

ENVIRONMENTAL, SOCIAL AND HEALTH MANAGEMENT PLAN (ESHMP)

Prepared by

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For

Sierra Rutile Ltd (Iluka)

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ACRONYMS

%	Percentage
″	Inch
^{0}C	Degrees Celsius
AC	Affected Community
AfDB	African Development Bank
CBD	Convention on Biological Diversity
CBO	Community-based Organisation
CC	Conservation Concern
CDAP	Community Development Action Plan
CDC	Community Development Committee
CEMMATS	Construction Engineering Maintenance, Manufacturing and Technical Services
CI	Corrugated Iron
CITES	Convention on International Trade in Endangered Species on wild flora and fauna
cm	Centimetre
cm^2	Square centimetre
CP	Closure Plan
CPR	Cardio Pulmonary Resuscitation
dB	Decibels
DO	Dissolved Oxygen
EBA	Endemic Bird Area
EC	Electrical Conductivity
EDA	Edward Davies and Associates
EDSA	Electricity Distribution and Supply Authority
EEZ	Exclusive Economic Zone
EGTC	Electricity Generation and Transmission Company
EHS	Environmental Health and Safety
EMF	Electro Magnetic Fields
EMP	Environmental Monitoring Plan
EPA-SL	Environment Protection Agency Sierra Leone
ERP	Emergency Response Plan
ESHIA	Environmental, Social and Health Impact Assessment
ESMP	Environmental, Social and Health Management Plan

EU	European Union
FC	Faecal Coliforms
GDP	Gross Domestic Product
GIS	Geographic Information Systems
GoSL	Government of Sierra Leone
GPS	Global Positioning System
ha	Hectare
HCB	Hexa-chlorobenzene
HCV	High Conservation Value
HDI	Human Development Index
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
HH	Household Head
HMC	Heavy Mineral Concentrate
IEZ	Inshore Exclusive Zone
IFC	International Finance Corporation
ILI	International Lending Institutions
IMR	Infant Mortality Rate
IOTA	Indigenous Transport Owners Association
IUCN	International Union for Conservation of Nature
IVS	Inland Valley Swamp
JSS	Junior Secondary School
km	Kilometre
km^2	Square kilometre
kVA	Kilovolt-Ampere
Le	Leones
m	Metre
MAFFS	Ministry of Agriculture, Forestry and Food Security
mamsl	Metres Above Mean Sea Level
mbgl	Metres Below Ground Level
MCH	Maternal and Child Health
MDA	Ministries, Departments and Agencies
MLA	Mine Lease Area
MLPCE	Ministry of Lands, Country Planning and the Environment
mm	Millimetre

MoE	Ministry of Energy (MoE)
MoTA	Ministry of Transport and Aviation
MOWHI	Ministry of Works, Housing and Infrastructure
MSP	Mineral Separation Plant
N	North
NGO	Non-Governmental Organisation
NPA	National Power Authority
NTU	Nepthielometric Turbidity Unit
OHS	Occupational Health and Safety
PAPs	Project Affected Persons
PCBs	Polychlorinated Biphenyls
PCDP	Public Consultation and Disclosure Plan
pH	Power of Hydrogen (measure of acidity)
PM_{10}	Particulate Matter (10 microns)
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
PRSP	Poverty Reduction Strategy Paper
PS	Performance Standard
RAMSAR	Convention on wetlands of international importance
RMFA	Road Maintenance Fund Administration
RPF	Resettlement Policy Framework
SIA	Social Impact Assessment
SL	Sierra Leone
SLEPAA, 2008	Sierra Leone Environmental Protection Agency Act, 2008
SLIEPA	Sierra Leone Import and Export Promotion Agency
SLP	Sierra Leone Police
SLRSA	Sierra Leone Roads Safety Authority
SLRTC	Sierra Leone Road Transport Corporation
SPSS	Statistical Package for Social Scientist
SRL	Sierra Rutile Limited
SSL	Statistics Sierra Leone
SSS	Senior Secondary School
STDs	Sexually Transmitted Diseases
TDS	Total Dissolved Solids
ToR	Terms of Reference

Turb.	Turbidity
UMU	United Mine Workers Union
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
Vu	Vulnerable
WHO	World Health Organisations
WMP	Waste Management Plan

GLOSSARY

Avifauna	Birds of a particular region, habitat, or geological period
Board of EPA-SL	Board of Directors that form the governing body of the EPA-SL; is headed by the Executive Chairperson; and consists of representatives from a number of line Ministries and three additional members of society.
Client	A person or organization using the services or advice of another professional person or company.
Communities	A group of interacting people, living in some proximity (i.e. in space, time, or relationship) that shares common values and has social cohesion.
Community Development Action Plan (CDAP)	A CDAP is a plan of action to address key community issues that are based on the expressed needs and aspirations of the local residents of the community Project area. These issues are deemed as basic developmental needs in the Project area.
Conservation	The planning, management, and implementation of an activity with the objective of protecting the essential physical, chemical, and biological characteristics of the environment against degradation. The process of managing biological resources (e.g., timber, fish) to ensure replacement by re-growth or reproduction of the part harvested before another harvest occurs. A balance between economic growth and environmental and natural resource protection.
Ecosystem	A community of interdependent organisms together with the environment they inhabit and with which they interact.
Environmental, Social and Health Impact Assessment (ESHIA)	The process of predicting and evaluating the social, health and environmental impacts and risks of a proposed Project and identifying mitigation measures that will enable the Project to meet the requirements of stakeholders, applicable laws and regulations, and any additional requirements for social or environmental performance identified by the Project, and so that impacts are as low as technically and financially feasible.
Environmental, Social and Health Management Plan (ESHMP)	A plan setting out all the proposed mitigation measures that the proponent of a Project will take to prevent, reduce, remedy and compensate for adverse effects, and to maximise the benefits of the project. Also, the plan for monitoring and auditing that will be undertaken to confirm compliance with the ESMP.
EPA-SL "checklist"	A list of procedures developed and provided by the EPA-SL to be systematically followed by a client to conduct the ESHIA process required for the issuance of an EIA licence.

Framework	An organized structure of policies, legislation, programs and tasks created to achieve a specific outcome. There can be frameworks for broad policies and strategic initiatives at various scales (*e.g.* provincial, regional, sector, media); programs and program delivery; and short-term tasks and projects.
Hazardous Waste	Substances classified as hazardous wastes possess at least one of four characteristics: ignitability, corrosivity, reactivity or toxicity – or appear on special lists.
Human Development Index	The Human Development Index (HDI) is a composite statistic used to rank countries by level of "human development", taken as a synonym of the older terms (the standard of living and/or quality of life), and distinguishing "very high human development"; "high human development"; "medium human development"; and "low human development" countries.
Hydrogeology	Hydro (meaning water), and geology (meaning the study of the Earth) is the area of geology that deals with the distribution and movement of groundwater in the soil and rocks of the Earth's crust (commonly in aquifers).
Hydrology	The study of the movement, distribution, and quality of water.
Invertebrates	Animal species that do not develop a vertebral column. This in effect includes all animals apart from the subphylum Vertebrata.
Mammals	Members of class Mammalia, air-breathing vertebrate animals characterised by the possession of endothermy, hair, three middle ear bones, and mammary glands functional in mothers with young. Most mammals also possess sweat glands and specialised teeth.
Mitigation measures	Designs, and methods for construction, operation and closure of a Project that are introduced into the plans for a project, to prevent adverse impacts, where impacts cannot be prevented altogether, to reduce them as low as is technically and financially feasible, and to remedy, offset or compensate for adverse effects, and measures to provide and enhance the positive benefits from a project.
pH	A measure (unit) expressing the acidity or alkalinity of a solution on a logarithmic scale on which 7 is neutral, lower values are more acid and higher values more alkaline. The pH is equal to $-\log_{10} c$, where c is the hydrogen ion concentration in moles per litre. pH in surface water is regulated by the geology and geochemistry of an area and is affected by biological activity. The distribution of aquatic organisms and the toxicity of some common pollutants are strongly affected by pH.
Pollution	Refers to both hazardous and non-hazardous pollutants in the solid, liquid or gaseous forms, and is intended to include other forms such as nuisance odours, noise, vibration, radiation, electromagnetic energy and the creation of potential visual impacts including light.

Potable Water	Water that is used for drinking, cooking, dishwashing, or other domestic purposes requiring water that is suitable for human consumption without the risk of health problems.
Project Interested and Affected Parties (IAP's)	Any person, group of persons, or organization interested in; affected by; concerned about; or with jurisdiction over an activity; development; project; policy; or action and who need to be consulted during the process of decision making.
Project Proponent	An individual, group or organization responsible for a project; creating a detailed Project description; and submitting it to stakeholders for analysis, review and acceptance.
Socio-economic data / study	Social science that studies how economic activity affects and is shaped by social processes. In general, it analyzes how societies progress, stagnate, or regress because of their local or regional economy, or the global economy.
Social Indicators	A "direct and valid statistical measure which monitors levels and changes over time in a fundamental social concern." Such as economic growth, values or goals. Social indicators are numerical measures that describe the well-being of individuals or communities. Indicators are comprised of one variable or several components combined into an index. They are used to describe and evaluate community well-being in terms of social, economic, and psychological welfare.
Stakeholders	Any and all individuals, groups, organizations, and institutions interested in and potentially affected by a Project or having the ability to influence a project.
Water Quality	The chemical, physical, biological, and radiological characteristics of water. It is a measure of the condition of water relative to the requirements of one or more biotic species and or to any human need or purpose.
World Bank	The World Bank is an intergovernmental pillar supporting the structure of the world's economic and financial order, it is an organization whose focus is on foreign exchange reserves and the balance of trade.

1 ENVIRONMENTAL, SOCIAL AND HEALTH MANAGEMENT PLAN

1.1 Background

Sierra Rutile Limited (SRL) is one of the world's largest rutile producing companies, generating high quality rutile, ilmenite and zircon rich concentrate. SRL's Mine Lease Areas (MLAs) are located approximately 135 kilometres (km) southeast of the Sierra Leone capital city, Freetown, and approximately 30 km east of the Atlantic Ocean.

In December 2016, SRL was acquired by and became a wholly owned subsidiary of Iluka Resources Limited (Iluka / the Company). Iluka, which has its headquarters in Australia, is the world's largest producer of zircon and a major producer of the high-grade titanium dioxide products, rutile and synthetic rutile. Iluka has significant industry technical expertise including mining; metallurgical; and processing capabilities. The Company explores internationally for mineral sand deposits and is currently conducting exploration activities in Australia; Sri Lanka; Kazakhstan; South America; Canada and in Africa.

SRL's MLAs span the Moyamba and Bonthe districts, which are further sub-divided into Chiefdoms. The Southern half of the MLA is known as Area 1; consists of discrete deposits; and has been extensively mined since its inception and for over 50 years. The majority of Area 1 has been mined by bucket line dredging accompanied by a wet gravity separation plant, which carries out pre-concentration functionality. Smaller deposits have been mined more recently by dry mining and associated pre-concentration plants. The resultant product, known as Heavy Mineral Concentrate (HMC), is trucked to the Area 1 Mineral Separation Plant (MSP) for further separation into individual product streams through incorporation of gravity; electrostatic; and magnetic separation methods.

With the deposits in Area 1 becoming exhausted, SRL plans to start mining the Sembehun deposits in the Northern half of its MLA (Area 5), which is located in the Bagruwa Chiefdom, some 30 km north of the Area 1. Mining will still proceed in tandem in some parts of Area 1 through dry mining, and potentially limited dredge mining (options analysis is currently underway). The inception of mining in the Sembehun deposits will require extensive preparation of the Sembehun area, as well as providing road haulage and power linkages with Area 1. Once the Sembehun mine is operational, HMC will be hauled from Sembehun to the Area 1 MSP, and power will be sourced from the existing 25 MW power station at the Area 1 MSP.

This Project requires an ESHIA for the haul road and transmission line linking Area 1 to Area 5 in order to obtain an Environmental Impact Assessment (EIA) Licence in line with requirements of the Environment Protection Agency of Sierra Leone (EPA-SL). ESHIA studies are concurrently being conducted for both the current operational site (Area 1) and the new Sembehun mine site (Area 5). SRL contracted the execution of the ESHIA studies on the Haul Road Construction and Transmission Line Installation to CEMMATS Group Ltd. (CEMMATS).

A Scoping Study was conducted in September 2017 culminating in the production of a Scoping Report which outlines the initial findings of the CEMMATS team and makes necessary suggestions for further work to be carried out during the main ESHIA investigations. This report, including a Terms of Reference (ToR) for the study, was submitted to the EPA-SL and subsequently approved.

The main ESHIA investigations have since been carried out by a team of environmentalists and socio-economists during October and November 2017. The ESHIA report presents the results and outcomes of data and information collected and consultations carried out during the study.

1.2 Introduction

The final ESHIA report consists of two (2) volumes of documents. Below are brief comments on the contents.

Volume 1 – The Executive Summary and Environmental, Social and Health Impact Assessment (ESHIA) contains the policy, legal and administrative framework under which the ESHIA was carried out. There is an analysis of the feasible alternatives, including the "no project" alternative, and a description of the Project in its geographic, ecological, social and temporal context. It includes baseline data describing the relevant physical, biological and historical conditions, as well as the potential environmental, social and health effects associated with Project implementation. Mitigation measures needed to control those effects to acceptable levels are presented, as well as an analysis of the cumulative impacts.

Volume 2 – Environmental, Social and Health Management Plan (ESHMP) presents the environmental, social and health management, mitigation, monitoring and institutional measures to be taken during Project implementation and operation, to reduce adverse environmental, social and health effects to acceptable levels. It specifically defines what actions must be taken and who is responsible to reduce Project impacts. The ESHMP also includes several component-plans defining specific action programs for waste management; emergency response; closure and reclamation; community development; public consultation and disclosure. The ESHMP highlights the issues and concerns that are presented in the ESHIA and identifies reasonable and practical responses to address and mitigate potentially adverse effects. It describes the specific actions that will be required to effectively implement those responses in a timely manner and describes the methods by which management will demonstrate that those requirements have been met. It also establishes the course that will follow in complying with GoSL's environmental laws and regulations as well as international policies and guidelines.

1.3 Management Plans

The Management Plans document the systems and processes that will be implemented throughout the road and transmission line construction Project to ensure compliance with local and international standards.

SRL will have the overall responsibility for ensuring that the construction contractor manages construction related risks by applying systematic risk management principles.

This volume is split into the following subsections listed in Table 1.

Table 1: List of Environmental and Social Management Plans for the Project

MANAGEMENT PLANS
ENVIRONMENTAL, SOCIAL AND HEALTH MANAGEMENT PLAN (ESHMP)
WASTE MANAGEMENT PLAN (WMP)
EMERGENCY RESPONSE PLAN (ERP)
ROAD SAFETY MANAGEMENT PLAN (RSMP)
COMMUNITY DEVELOPMENT ACTION PLAN (CDAP)
PUBLIC CONSULTATION AND DISCLOSURE PLAN (PCDP)
CONCEPTUAL CLOSURE PLAN (CP)
ENVIRONMENTAL MONITORING PLAN (EMP)

Figure 1 schematically summarises the links between the ESHIA, ESMP, Management Plans and Monitoring Plans.

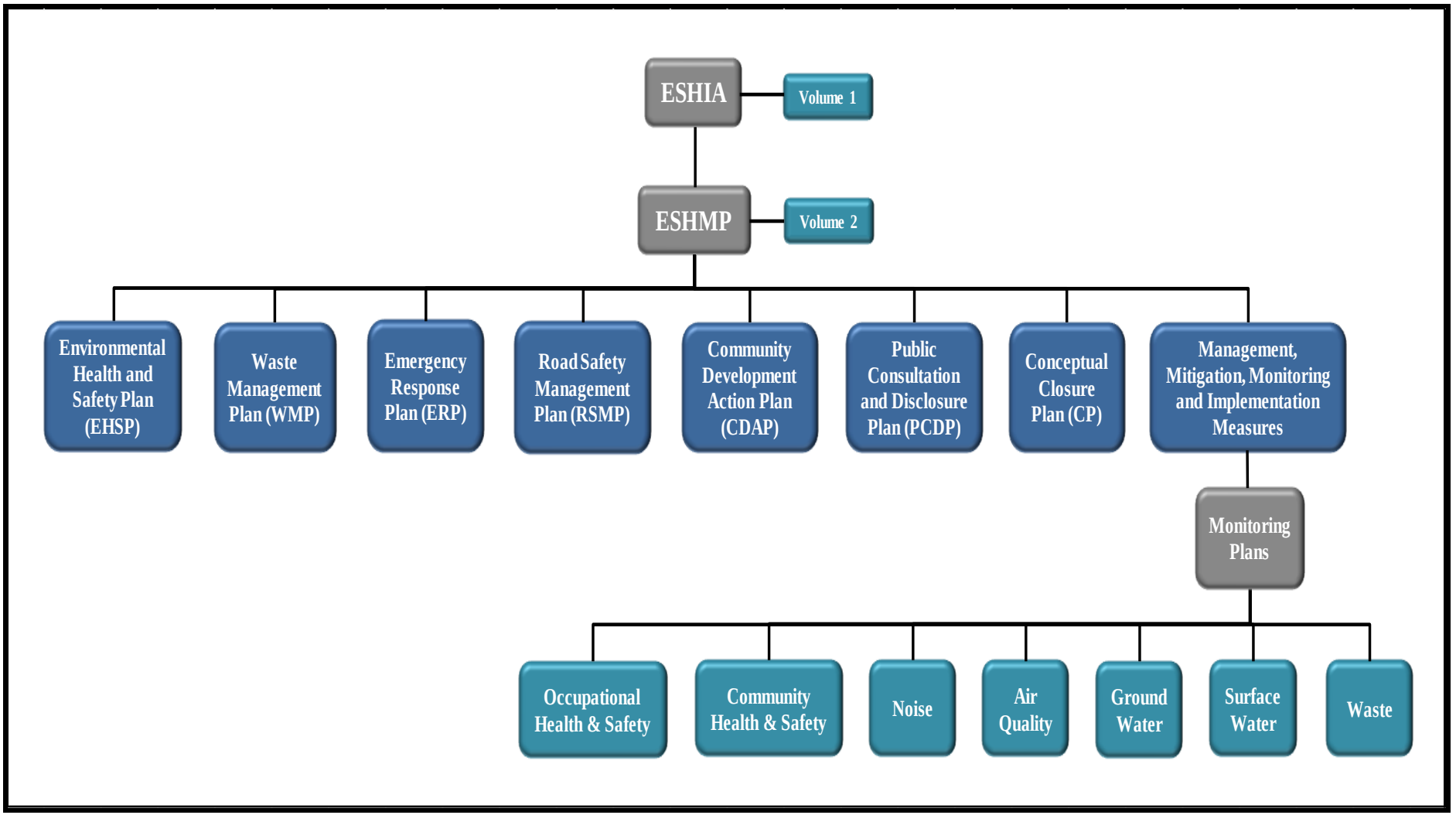

Figure 1.2-1: ESHIA Overview

1.3.1 Environmental, Social and Health Management Plan

The Environmental, Social and Health Management Plan (ESHMP) for the Project identifies the principles, approach, procedures and methods that will be used to control and minimize the environmental, social, health and safety impacts of all construction and operational activities associated with Project development.

1.3.2 Waste Management Plan

The Waste Management Plan (WMP) describes the procedures, systems, equipment, and structures specific to waste management and disposal. Waste generation should be limited at all levels of the operation in order to decrease the volume of waste generated and make waste disposal more manageable. The WMP also defines who is responsible for developing and implementing the plan, and what records and reporting will be required.

1.3.3 Road Safety Management Plan

The Road Safety Management Plan (RSMP) outlines road safety precautions which must be implemented to prevent drivers on the road from causing unnecessary accidents and at the same time helping pedestrians and cyclists understand the rules governing their safety on a major road. The RSMP details the road safety and traffic management principles, strategies and measures that will be applied, road user requirements including: provision of a safe environment for the travelling public, and minimising impacts on the road network. The RSMP further highlights the social and economic implications of road traffic accidents, in order to appreciate and drastically reduce such accidents and help raise awareness for road safety improvement.

1.3.4 Emergency Response Plan

The Emergency Response Plan (ERP) provides employees and managers with specific instructions that will allow them to respond quickly and efficiently to any foreseeable emergencies likely to occur during the Project. It is developed using recognized and accepted methods and practices, and includes specific responses, protocols, and management contacts. The ERP essentially has the goal of protecting people, the environment, property and the operations. This document deals with typical emergency types that characterize the operation which include:

- Fire or explosion;
- Pollution or chemical spills;
- Road traffic accidents;
- Flooding, rain storm (natural disaster);
- Medical health cases, and
- Civil unrest & disturbances.

1.3.5 Community Development Action Plan

The Community Development Action Plan (CDAP) outlines the recommended development and social assistance programmes, which are aimed at improving the living conditions of the local communities in a sustainable manner.

1.3.6 Public Consultation and Disclosure Plan

The Public Consultation and Disclosure Plan (PCDP) is intended to define objectives and establish the framework necessary to provide understandable information to all parties involved. This plan will be implemented to ensure timely and effective communication between the project's management (SRL) and the affected stakeholders. The main objective of the PCDP is to establish a program for multi-directional communication between the management and stakeholders.

1.3.7 Conceptual Closure Plan

The conceptual Closure Plan (CP) documents plans to be put in place when the haul road will no longer be required by the company e.g. at end of mine life.

Once the Project has reached its economic life span and renders no further beneficial post-operational use for the Company, the road will be handed to the management of GoSL. In the event that GoSL does not accept responsibility for the upkeep of the road, or does not foresee a further beneficial use thereof, the Mines and Minerals Operational Regulations, 2013 stipulates: "Where roads are no longer necessary, the site must be restored as follows:

- at road surfaces; shoulders; escarpments; steep slopes; regular and irregular benches must be rehabilitated to prevent erosion, and
- road surfaces and shoulders must be scarified, blended into natural contours and re-vegetated."

The closure plan describes the closure and post-closure activities considered for the project. It incorporates both the physical rehabilitation and socio-economic considerations as part of the Project life cycle (IFC EHS Guidelines – Mining, 2007).

1.3.8 Environmental Monitoring Plan

The Environmental Monitoring Plan (EMP) outlines a comprehensive monitoring plan.

2 ENVIRONMENTAL, SOCIAL AND HEALTH MANAGEMENT PLAN

2.1 Introduction

The ESHMP identifies the principles, approach, procedures and methods that will be used to control and minimize the adverse environmental and social impacts of all road and transmission line construction and operations activities. It is intended to complement the project's ESHIA and ensure that commitments made by SRL to minimize Project related adverse environmental and social impacts (as highlighted in the Company's policies), are upheld throughout all Project phases.

A suite of SRL and Iluka corporate policies guide environmental and social management of the SRL operations. These policies include:

- SRL's Sustainability Policy (2015) – commits the company to implement management systems that make health, safety, environment and community responsibilities an integral part of business decisions and activities;
- SRL's Environmental Policy (2015) – commits the company to environmental excellence based on the promotion of open and honest communication on environmental and community issues, protection of the environment, promotion of sound and responsible practices and fostering of continual improvement;
- SRL Occupational Health and Safety Policy (2015) – commits the company to "zero harm" to people and achievement of highest standards across the operations. This includes the compliance to Sierra Leonean law and alignment to the OSHAS 18001 system, and
- Iluka Health, Safety, Environment and Community Policy (2017) – commits the company to operate in a sustainable manner by targeting high levels of performance and pursuing leading practice in the areas of health, safety, environment and community reflecting the company's values of Commitment, Integrity and Responsibility.

2.2 Overview

An integrated management plan was developed, based on the impacts identified as part of the ESHIA. The tables below outline these proposed measures to be implemented during both the construction, and the operational phases of the project.

2.2.1 Management and Mitigation during Construction Phase

Table 2.2.1: Construction Phase ESHMP

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
Soil Erosion	Soil Erosion is likely to occur as a result of earthworks including the exposure of loose soil as a result of vegetation clearing, creation of embankments, etc. Eroded material can block drains and also end up in watercourses, affecting water quality.	- Slope stability measures will be incorporated such as benching and installation of erosion protection features such as silt barriers and sedimentation ponds. - Area to be cleared will be kept to the minimum necessary to prevent disturbance of soils outside the boundary. - Develop Sediment and Erosion Control Management Plan, to minimise risk of soil erosion and ensure dispersion of sediment into aquatic environments are avoided where possible. - Drainage channels to be constructed to divert uncontaminated surface run-off away from construction work areas. - Where possible, drainage outlets will discharge into vegetated areas and not to exposed soil. - Vegetation along drainage lines and gullies will be protected where practicable to provide natural attenuation of flows. - Construction activities and movement of construction vehicles outside designated areas and transport routes will be minimised. - In areas of ground clearance, topsoil will be stripped and salvaged as much as possible
Hydrogeology	Excavation, land clearance and development of roads could give rise to interruption of hydrogeological conditions and groundwater flows.	- Design roads to avoid intrusion below the water table where possible; maintain ground water flows; and avoid significant impacts on hydrogeological conditions. - Avoid, as far as possible locations where springs occur, or the water table is close to the surface.
Water Quantity	Water abstraction from local water sources may result in reduced water availability to local communities and ecosystems.	- Potable water will primarily be obtained from SRL's water reservoir and water treatment facility. - Water for construction will be abstracted from nearby surface water sources. - No water will be abstracted without the prior approval of relevant authorities. - In the event that there is any valid dispute regarding water extraction by communities, alternative water sources will be provided to those affected (e.g. boreholes) - Water use will be monitored and recorded to maximise efficiency of water use and minimise waste. - Recycling of water will be undertaken where practical and safe. - Preventative maintenance and regular inspection of water tanks will be undertaken to minimise the risk of leaks and remedial action implemented as soon as possible.
Water Quality	Pollution of water resources may arise at or close to the base camps and work-sites as a result of inadequate provision of sanitary and waste facilities, and accidental spillage or leakage of polluting materials. Pollution may also occur during	- All machinery and equipment is to be maintained in a good condition and serviced according to the OEM specifications. - Refuelling, maintenance and wash-down of construction vehicles and equipment will only occur in designated areas and away from surface water bodies, and provided with secondary containment measures. - Adequate controls for the storage, use and handling of hazardous chemical substances must be in place at all times. Safety Data Sheets (SDSs) will be available at the point of use and all hazardous materials will be clearly labelled. Personnel should be trained in the use of such hazardous substances and adequate spill prevention (including the availability of spill kits) and emergency response plans will be adopted.

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure

	construction operations carried out within the Gbangbaia River.
	
	Such pollution adversely affects those who depend on local water resources.
		- The construction contractor will be contractually required to take all reasonable precautions to prevent and clean up all spills / leaks, and take necessary measures to prevent materials from falling into the river.
		- If necessary, alternative water sources will be provided to downstream users of the Gbangbaia River as disturbance of the water during construction cannot be entirely avoided.
		- The Environmental Management Plans including spills and waste management measures will be implemented.
		- Work to be undertaken close to surface water bodies will be limited as far as possible. Where not possible, e.g. at water crossings, additional measures will be taken to ensure that pollution of water resources does not occur, including minimising disturbance of river banks.
		- For construction of the Moselolo bridge:
		  - The duration of construction activities will be as short as practicable, and will be undertaken in the dry season;
		  - The construction of the bridge will take into account the hydraulics of the watercourse in the design to consider stability and flow disruptions, and
		  - The isolation and controlled dewatering of areas where pylons will be installed using a suitable method.
		- Sewage produced at the construction sites will be collected and transported to the Area 1 sewage treatment system for suitable treatment.

Hydrology	Potential effects of road construction on surface water hydrology and hydraulics include:
	
	- Temporary increased surface runoff due of vegetation loss, topsoil removal and soil compaction on land adjacent to watercourses, and
	- Alterations in flow velocities, increased erosion and subsequent changes in bed and bank stability as a result of works within or adjacent to watercourses.
		- Road construction will be carried out in a way that minimises the disturbance in waterways.
		- The bridge, all culverts and other stream crossing infrastructure will be designed in accordance with international standards, and to accommodate expected stream flows.
		- Temporary fencing off of areas around waterways to prevent unnecessary disturbance should be employed. To facilitate this, erosion and sediment control structure, stormwater and management techniques will be used such as:
		  - Sediment fencing;
		  - Erosion control mats;
		  - Energy dissipaters, and
		  - Sediment basins should be implemented prior to any works upstream or within waterways commencing.
		- Land susceptible to flooding will be avoided where possible.
		- Disturbance of soils will be avoided during heavy rainfall and the activities with the potential to cause significant erosion will be carried out during the dry season where possible.
		- Design road drainage to collect and control the flow of run-off from the road surface and minimise changes in established hydrological regimes, taking into account gradient, catchment size, expected flows, and upstream and downstream uses of receiving watercourses.

Aquatic Ecology	Aquatic flora and fauna may be affected as a result of pollution from soil and other contaminants being carried into water ways by surface runoff, as well as construction activities occurring directly in water ways (installation of bridges and culverts).	- The construction contractor will implement waste management and environmental health and safety plans to limit water pollution. - The bridge, all culverts and other stream crossing infrastructure will be designed in accordance with international standards. - Working within watercourses, or on their banks, will be restricted, except where necessary to construct a bridge / particular structures. If work in watercourses is required, measures will be implemented to ensure significant impacts on aquatic habitats do not occur. - Sensitive species habitat will be avoided as far as practicable. - Install suitable culverts at small streams to allow for the movement of aquatic species.

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
	Organisms may die or have their mating, migration and other activities interrupted.	- Water required for the Project will only be obtained from sustainable water sources avoiding adverse impacts on aquatic ecosystems.
Terrestrial Fauna	Mammals and birds will be impacted mainly from vegetation clearance and loss of forest cover, which is the key habitat for most of the species that are not tolerant to forest loss. This may result in forced migration and potentially death. The road construction will also allow additional access of humans and vehicles to previously un-disturbed areas. The construction of power line infrastructure may result in increased bird collisions with the lines.	- Vegetation clearing will be strictly confined to the areas where their presence would otherwise affect the construction work, or operations (in relation to transmission lines). - Where possible, the road, borrow pits, construction camps and power transmission line corridor will be designed to avoid and maintain a buffer zone around areas of conservation interest. - Disturbed habitats will be rehabilitated on completion of construction including creation of wildlife corridors to mitigate fragmentation as required. - Project personnel will be strictly forbidden from engaging in hunting, selling or purchasing bushmeat during work hours or within the Project work areas or facilities. - Induction training for all Project personnel will include communication of relevant information regarding bushmeat hunting and important local resources. Project personnel will engage local stakeholders to manage potential impacts in this regard. - Trenches or holes created during site works will be rendered safe for animals when unattended through covering or provision of an egress ramp. - Measures will be taken to minimise the risk of collisions between animals and vehicles. Signposts and speed limits will be established where necessary. Non-essential travel at night and driving off road will be prohibited. - During construction, install bird collision avoidance measures on the powerlines, as well as perch deterrents and alternate elevated perches, as well as raptor hoods. - Implement an appropriate fauna monitoring programme.
	Disruption of sensitive faunal communities.	- Where endangered species habitats are identified during the construction phase, a suitably qualified specialist shall be contracted to develop and implement a species-specific relocation management plan.
Vegetation	A major unavoidable impact of road works and transmission line installation is the effect on the terrestrial vegetation in the vicinity of the construction works. Loss of vegetation which in some cases will be permanent (removal of trees which could affect transmission lines) is unavoidable.	- Route selection has taken sensitive terrestrial vegetation locations into consideration, and these areas were avoided where practicable as part of the design process. - Avoid such areas if feasible / clear the minimum footprint required. - In general, the contractor will ensure that clearing of vegetation will be restricted to work areas only, to prevent excessive loss of vegetation. - Plant species of conservation interest will be avoided wherever possible. If they cannot be avoided, they will be relocated if possible to other suitable locations that will not be disturbed. - Harvest seed / fruit from species of importance and establish on site nursery to propagate these species for later use. Once construction has been completed, replant native species. - Vegetation clearance is to be undertaken using mechanical means. - Only where absolutely necessary, shall bio-degradable herbicides be used.
	Disruption of agricultural activities where the route alignment passes through agricultural fields.	- Follow the existing road infrastructure where feasible, and clear the minimum footprint required. - Avoid routing through the croplands where possible. - Undertake crop compensation well in advance of construction commencement. - Assist affected persons with livelihoods restoration.
	Removal of natural	- Route selection has taken riverine vegetation locations into consideration, and

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
	riverine vegetation, including potentially sensitive local ecosystems. This will be a very localised impact at the bridge construction site, and at small stream crossings.	these areas were avoided where practicable as part of the design process. - Avoid such areas if feasible, clear the minimum footprint required and minimise the disturbance of adjacent habitats limited. - Where practicable, relocate species of importance prior to commencement of construction. - No herbicides are to be used within 100 meters of a riverine environment. - Appropriate culverts will be installed to minimise secondary and/or ongoing impacts. - Construction shall be conducted as far as possible during the dry season. - Once construction has been completed, replant native species.
	Localised disruption of ecosystem functions, such as ecosystem connectivity and fragmentation.	- Clear the minimum footprint required. - Where practicable, enlarged culverts shall be installed to minimise impacts on aquatic environs.
	Ingress of alien and/or invasive species.	- Implement an appropriate alien / invasive species monitoring and management plan.
Spoils Disposal	Disposal of spoils in unsuitable areas such as hilly terrain could result in environmental impacts including erosion, water pollution, obstruction of drainage patterns, etc.	- The contractor will be required to locate spoils sites as far as possible from productive land (e.g. vegetated or subject to some other land use) in designated areas, subject to approval of the Project manager. In as far as practicable, spoils will be backfilled into the borrow pits as part of the rehabilitation of these borrow pits. - Side tipping of spoils in any hilly locations will be strictly prohibited. - Roads designed to achieve a balance between the amount of spoil produced from cuttings and that required for fill to minimise the need for disposal of surplus.

Waste Management	Improper management of waste may result in environmental and human health hazards such as pollution and disease.	- Waste bins will be stationed at designated points (e.g. in the construction camps) for the disposal of the various types of wastes generated by the project. These bins will be clearly marked to facilitate segregation of waste.
		- Separation of domestic and hazardous waste at the source shall be strictly enforced.
		- Domestic waste shall be collected, transported to and disposed of at the Area 1 landfill site. Hazardous waste shall be securely stored in a designated hazardous waste storage facility at Area 1.
		- Where possible, wastes will be re-used or recycled.
		- Burning of waste will not be permitted except in appropriate incineration facilities (Planned Area 1 Engineered Landfill Facility with incineration capabilities)
		- Medical wastes will be incinerated at the Area 1 Clinic incineration facilities.
		- A Waste Management Plan (WMP) will be established and will include:
		  - Clear objectives and targets with respect to waste management;
		  - An analysis of types/quantities of waste to be produced by the Project;
		  - An analysis of potential opportunities to reduce, reuse or recycle waste in accordance with the Waste Management Hierarchy (reduction, re-use, recycling, disposal) and a description of how this will be achieved;
		  - A description of roles, responsibilities and resources to ensure that the objectives and targets are achieved, and
		  - procedures governing the handling, treatment and disposal of all wastes.
		- All personnel will be trained in the appropriate management of waste according to the WMP.
		- Waste materials that can be safely reused or recycled may be donated to local

<table>
<tr><th>Environmental Aspect</th><th>Impact Description</th><th>Mitigation / Enhancement Measure</th></tr>
<tr><td></td><td></td><td>communities following an appropriate risk assessment by EHS personnel.</td></tr>
<tr><td>Noise and Vibration</td><td>Noise and vibration result from construction activities such as the operation of heavy machinery, concrete mixing plants, blasting in areas of rock excavation, stone crushing, traffic etc.

Noise and vibrations will be a source of disturbance to communities close to the road alignment and if excessive could cause health complaints</td><td>- Activities producing excessive noise levels (such as crushing and screening at the borrow pits, as well as blasting), will be restricted to the day-time, and equipment normally producing high levels of noise should be suppressed or screened when working within a distance of some 200 m from any sensitive noise receptors.
- Near places of worship, construction producing nuisance level noise be minimised or rescheduled so as not to occur on locally recognised religious day.
- Work areas, will be organised and operated strive to restrict noise levels to not exceed World Bank thresholds at the nearest sensitive receptor during normal activities. If existing noise levels exceed these threshold values, the Project will not cause more than a 3dB increase in measured ambient levels during normal activities.

<table><tr><th rowspan="2">Receptor</th><th colspan="2">Noise level
One Hour L_{Aeq} (dBA)</th></tr><tr><th>(Type of district)</th><th>Daytime
07:00 – 22:00</th><th>Night-time
22:00 – 07:00</th></tr><tr><td>(a) Residential; institutional; educational</td><td>55</td><td>45</td></tr><tr><td>(b) Industrial; commercial</td><td>70</td><td>70</td></tr></table>
- Advance notice will be given to communities if short-term noisy construction activities are to take place, which could cause these levels to be exceeded. Communities in proximity to blasting activities will be given warning prior to blasting occurring.
- Measures to minimize noise during construction will include:
  - locating and orientating equipment to maximise the distance, and to direct noise emissions away from, sensitive areas;
  - using buildings, earthworks and material stockpiles as noise barriers where possible, and
  - turning off equipment when not in use.
- A preventative maintenance program established for equipment and vehicles to not emit excessive noise or vibration due to inadequate maintenance or damage
- Personnel will be made aware of the importance of minimising noise and the measures that are required in this regard.
- The road will be constructed in such a way as to by-pass all communities thereby reducing noise and vibration impacts from traffic.
- Explosives magazines will be constructed and managed in accordance with legal and international best practice standards. The magazines will be located in secured locations.
- Blasting will be undertaken in a manner which minimises vibration in as far as practicably possible.</td></tr>
<tr><td>Road Safety</td><td>During the construction phase, traffic levels are not unlikely to be high enough to give rise to problems of crossroad access for pedestrians.</td><td>- Training of drivers and machinery operators will be conducted; community consultations and meetings on road safety will be held.
- Where practicable, pedestrian paths will be created.
- Road safety initiatives will be developed and implemented, including:
  - Ensuring that only qualified (licenced) drivers operate machinery;</td></tr>
</table>

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
	However, vehicle traffic and average speeds will be slightly higher in construction areas than at present. Pedestrians and livestock are likely to continue to use the road and will be at increased risk of road accident.	- Implementing speed limits and traffic control measures in appropriate locations; - Implementing road safety signage; - Avoiding dangerous routes and times of day to reduce the risk of accidents; - Installing speed control devices such as governors on trucks, and - Remote monitoring of driver behaviour.
OHS	Injuries at construction work-sites, falling objects, as well as from the use of equipment and tools, cuts from stepping on sharp objects such as nails and other metal off-cuts are likely to occur. OHS issues related to the transmission line construction include exposure to live current and electromagnetic waves.	- An appropriate OHS management system will be implemented, which is consistent with the SRL standards and requirements. - Safety signs will be erected to indicate restricted areas around active work, specifically electrical installation areas, borrow pits, and excavated areas. - Workers will be provided with all the required PPE. - Toolbox talks will be carried out daily on safe work practices and other OHS issues. - Only trained and qualified technicians will be involved in the electrical installations. Regular training will be conducted for electrical technicians as well as road construction workers to ensure they are aware of the safe work practices required when working with or in the vicinity of transmission line equipment.
Land Use	Community land will be required for the establishment of worksites, borrow areas, etc. to be used during construction, resulting in a permanent loss of access to these areas by community people.	- Land lease arrangements will be made for any land community land to be utilised during this phase. - The route has been designed to avoid villages to mitigate the need to relocate / displace people. - Crop compensation will be undertaken in advance of the construction process. Where necessary, Livelihood Restoration Plans may be implemented for some farmers. - Once the construction phase is concluded, the contractor will be required to ensure that any land affected outside of the right of way, are returned to the state in which they were before use. This will include removal of all wastes, demolition and removal of unwanted structures, clearing away of any contaminated soils.

Crops	Loss of farmlands and crops will occur during clearing of the road and transmission line corridor, resulting in loss of livelihood to community owners.	- The contractor will ensure that clearing of vegetation will be restricted to work areas only, to prevent excessive loss of vegetation.
		- Compensation will be made to owners of crops lost during construction. Where necessary, Livelihood Restoration Plans may be implemented for some of the affected farmers.
		- Designs will be developed to minimise displacement of resources of importance to communities and livelihoods including:
		  - High quality agricultural land including rice fields;
		  - Community forests, and
		  - Other significant community resources.

Heritage	Loss of heritage and other cultural sites which fall along the route will occur, depriving communities in various ways.	- Necessary arrangements will be made with the Paramount Chiefs and other local authorities for conducting the required rites and ceremonies for the relocation of cultural heritage sites. - All Project personnel will be required to respect local cultural traditions and religious festivals, funerals and other traditional events. Induction training for all personnel will include appropriate cultural awareness training. - A chance finds procedure will be developed and implemented.

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
STDs, HIV/AIDS and Teenage Pregnancy Issues	The risk of the prevalence of STDs, HIV/AIDS and teenage pregnancy in nearby communities is increased with the interaction of construction workers with community youth.	- Sensitization and awareness raising will be provided among workers and communities. - All Project personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS, STDs and malaria along with the prevention and mitigation measures required. - Inappropriate behaviour by Project personnel will be carefully managed through relevant human resources processes to minimise the potential spread of illnesses and infective diseases.
Community health	Pollution of air, water or soils and the release of hazardous substances or inappropriate management of waste could adversely impact on the health and welfare of the community or lead to increased occurrence of pest species (vermin, flies, mosquitoes).	- Community health and safety will form an integral part of the construction management plan. - Populations of pest species and vectors of disease will be carefully managed to minimise the potential spread of illnesses and infective diseases. - A high standard of housekeeping will be maintained at all times in all construction work areas. - Pools of standing water will be avoided to minimise the availability of breeding grounds for mosquitoes. - An appropriate hazardous chemical substances management plan will be implemented.
Air Quality	Dust generated from construction machinery can cause considerable nuisance to communities close to the road alignment, and can cause health problems including respiratory complaints / diseases.	- Dust minimization measures shall be implemented including watering of the construction areas, including the road surfaces under construction. - Soil stockpiles and stores of friable material will be covered or vegetated to reduce the potential for fugitive emissions of dust where possible. - Speed controls will be implemented where appropriate to minimise dust creation by vehicles travelling on un-made roads. - Vehicles carrying friable materials will be enclosed or sheeted. - Driver training will include awareness-raising regarding appropriate driving speeds to minimise dust emissions during different weather conditions. - Loading, unloading and handling of dusty materials will only be carried out in designated areas.
	Emissions from construction activities like fuel combustion, power generators, concrete batching plant, operational vehicles could cause adverse impacts on air quality affecting the health and welfare of people, crops and sensitive natural fauna and flora	- Effective preventative maintenance established to ensure all construction equipment and electricity generators are maintained in good working order and do not adversely impact air quality due to inadequate maintenance or damage. - Concrete batching, crushing and screening plants will be fitted with dust extraction and / or suppression systems where necessary. - Use of ozone depleting substances such as chlorofluorocarbons (CFCs), halons, carbon tetrachloride, trichloroethane and halogenated hydrobromofluorocarbons (HBFCs) will not be permitted. - Speed controls will be implemented where appropriate to minimise dust creation. - Driver training will include awareness-raising regarding appropriate driving speeds to minimise air emissions during different weather conditions.

	Project activities could introduce new ignition sources associated with equipment and workers and therefore could contribute to an increase in the risk of bushfires	- Strict controls will be in place to minimise the risk of bushfires being caused accidentally by Project activities including:
		  - A ban on unauthorised open fires;
		  - Storage of flammable substances in accordance with good international standards for fire safety including fitting flame arresting devices to vents, segregation of incompatible substances, engineered earthing and lightning protection;
		  - Fitting of earthing and lightning protection to other structures vulnerable to lightning strike;

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
		- Control of hot work using a strict permit to work system, and - Creation of firebreaks around work areas and mobile field camps, where appropriate. - Emergency response plans and fire-fighting arrangements will be put in place to facilitate response to fire including natural bushfires, where there is a direct threat to assets. Trained fire crews will be available. All personnel will be provided with appropriate training regarding fire-related hazards and first response. Adequate water supplies for use in the case of a fire will be available in critical locations.
Community Benefits from Project	Job Opportunities for skilled and unskilled members of the community Business opportunities to provide goods and services to workers (e.g. food and drink)	- Although labour recruitment is a matter for the contractor, who has the right to determine whom to employ, he will be formally encouraged to hire locally wherever possible, in order to maximise the benefit distribution and social acceptability of the project. - An employment plan will be developed to define requirements and procedures to be followed when identifying and developing Project employment opportunities. This employment plan and any local employment opportunities will be communicated in a transparent and culturally appropriate manner. - Unskilled labour will be preferentially hired from the local communities. - A vocational training plan will be prepared to provide training to local people to increase their eligibility for employment. In addition, selected community employees will receive skills training to allow them to progress from unskilled to semi-skilled / skilled positions. - Opportunities for sustainable local procurement of goods and services to support road construction will be identified wherever possible and measures will be devised to maximize the potential for these opportunities.

2.2.2 Management and Mitigation during Operational Phase

Table 2.2.2: Operational Phase ESHMP

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
Soil Erosion	Ongoing soil erosion along the constructed infrastructure.	- Implement a soil monitoring programme in accordance with the Sediment and Erosion Control Management Plan, involving regular inspections along all constructed infrastructure. - Remediate any soil erosion. - Where necessary, implement additional preventative measures as may be required.
Water Quality	Erosion around pylons and culverts may cause increased sediment load in water.	- Monitor areas around pylons, culverts and other installed infrastructure for signs of erosion and implement suitable mitigation measures where required.
Hydrology	Obstruction drainage leading to creation of puddles of stagnant water	- Road drainage systems inspected and cleaned as necessary and maintained
Aquatic Ecology	Infrastructure in streams may limit the movement of aquatic species.	- Maintain culverts and other structures in waterways to ensure that impacts on aquatic species are minimised, including where necessary, removing sedimentation build up / other blockages in such culverts.
Terrestrial	Mammals and birds	- Company drivers will be taught safe driving techniques which involve accident

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
Fauna	will be impacted by the haul road and transmission line operations including collisions with vehicles, birds colliding with transmission lines and towers, forced migration to other areas as a result of noise and other human activities.	prevention including collisions with animals. - Monitor animal – vehicle interactions and retrain drivers if needed. Where necessary, consider the implementation of appropriate animal crossings. - Maintain elevated perches, perch deterrents, raptor hoods and marker balls / flappers. - Maintain the right of way area vegetation in an appropriate manner, including ongoing eradication of alien / invasive species. Continue with the monitoring of faunal species occurrence.

Vegetation	Controlling vegetation in the right of way area.	- Continuously maintain vegetation in the right of way area including:
		  - From the edge of the road to the boundary of the right of way, ensure that vegetation is structured with smaller plants near the road, and larger shrubs further away to provide habitats for a variety of plants / animals;
		  - Removing trees which may interfere with the powerlines;
		  - Maintaining vegetation by mowing, pruning and slashing to the extent necessary to ensure safe conditions, but avoid unnecessary over maintenance to limit the ingress of invasive species and continual reestablishment of pioneer species;
		  - Eradicating alien / invasive species;
		  - Continue to maintain fire breaks, and
		  - Continue to avoid the use of chemical herbicides.

Waste Management	Poor waste management systems along the route will result in littering from road users which could end up in drainages, causing pollution of waterways, blocked gutters, flooding, etc	- - Waste bins will be stationed at the drivers start and end points. Truck drivers will have to transport waste in trucks until such a time as appropriate disposal into bins can take place. Regular emptying of these bins will be required, and waste shall be disposed of at the Area 1 landfill site. - Environmental health and safety training for drivers will include waste management systems and responsibilities. - Waste receptacles shall be provided at drivers start and end points. - Community awareness programmes will include some waste management awareness issues.
Noise and Vibration	Communities may be affected from the noise and vibrations emanating from the mining vehicles and machinery utilizing the road.	- Communities have been avoided and by-passed during the planning and construction phases and impacts from noise and vibrations should be minor due to distance from road. - Continue to conduct noise monitoring at sensitive receptors, and implement additional traffic calming measures if found to be necessary.
Road Safety	Road accidents resulting in personal injury or death may occur due to the fact that there will be an increase in vehicular activities following the upgrade, which surrounding communities were not previously used to.	- Training of drivers including road safety issues will be conducted regularly; community consultations and meetings on road safety will be held to help raise awareness among community residents. - Drivers will be required to remain within the 80 km/hr speed limit, and any other more localized speed limits implemented based on the road design and risk assessment. - Other traffic calming measures may be incorporated into the road's final design. - Speed monitoring will be conducted using SRL's GPS tracking system. - Segregated pedestrian access will be provided along the length of the bridge and where necessary along the road. - Community members will be made aware of hazards associated with increased traffic, and provided with appropriate information regarding safety provisions. - Adverse impacts on people and communities will be avoided through appropriate road maintenance, driver training and ongoing communications with communities and local authorities.

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
OHS	Injuries and illness caused by undertaking Project activities.	- A comprehensive, risk based occupational health and safety management plan will be developed and implemented. The plan will be in line with relevant legislative requirements, as well as conform to Iluka's corporate standards. - Aspects such as risk assessment and control, work instructions, training, PPE, etc. will be comprehensively addressed in the plan.
	Drivers are prone to OHS hazards related during their daily activities that could result in destruction of vehicles, personal injury and even death.	- Drivers will be given road safety training including observation of speed limits, safety signage, etc. on a regular basis. - Only licenced drivers will be employed. - Shift systems are in place to ensure that drivers are not operating vehicles when sleepy or tired. - Drivers will be subjected to random alcohol tests.
	Road maintenance workers will be subject to OHS hazards similar to construction hazards. Personal injury could occur from use of equipment and tools, dust and noise generation, etc.	- Only trained road repair technicians will be used for road maintenance. - They will be provided with PPE required for the nature of the work. - Toolbox safety talks will be conducted daily. - First aid and medical facilities will be made available.
	Transmission line maintenance workers will be subjected to related OHS issues such as working at heights, exposure to live current and electromagnetic frequencies.	- Only trained electrical technicians will be used for transmission line repairs. - Appropriate OHS safety practices will be implemented and enforced. - A task specific risk assessment will be conducted prior to commencement of transmission line repairs. - They will be provided with PPE required for the nature of the work. - Toolbox safety talks will be conducted daily. - First aid and medical facilities will be made available.
Dust Pollution	Communities and pedestrians may be affected from the dust generated from the road from vehicular activities.	- This will be an impact during the dry season and portions of the rainy season; the road will be regularly watered during these periods. If practicable, commercially available dust palliatives will be applied to the road surfaces. - Community grievances will be recorded through SRLs formal grievance procedure. - Dust fall out monitoring will be conducted, and any additional measures required, will be implemented.
Exposure to Electromagnetic Fields	Communities may be exposed to electromagnetic fields emanating from the transmission lines resulting in possible health impacts.	- The strength of electromagnetic fields fades with distance from the source. Due to the height of the towers to be erected and the distance between communities and the haul road alignment, the likelihood of this occurring is low. - Regular monitoring of the strength of EMF will be undertaken and suitable mitigation measures implemented as / when needed.
STDs, HIV/AIDS and Teenage Pregnancy Issues	The risk of the prevalence of STDs, HIV/AIDS and teenage pregnancy in nearby communities is increased through interactions with company drivers and the increased number of road users.	- Sensitization and awareness raising will be provided among workers, drivers and community members. - All project personnel will be provided with appropriate induction training communicating health hazards, including HIV/AIDS, STDs and malaria along with the prevention and mitigation measures required. - Inappropriate behaviour by Project personnel will be monitored and managed.
Community Benefits from Project	Improved transport availability and reduction in transportation costs for	- Ensure that the road and bridge are well maintained to ensure safe use of this infrastructure to the public. - Linking the Moyamba and Bonthe Districts would greatly enhance access to

Environmental Aspect	Impact Description	Mitigation / Enhancement Measure
	passengers and goods due to reduction in vehicle operating costs as a result of improved road conditions. Construction of a bridge across the Gbangbaia River, linking the Moyamba and Bonthe Districts thereby greatly enhancing access to agricultural products and trade. Improved access to job and business opportunities, medical facilities, schools and other social amenities. This will translate into improved socio-economic conditions within surrounding communities. Better administration and co-ordination of government activities with improved road network.	agricultural products and trade. - Improved access to job and business opportunities, medical facilities, schools and other social amenities. This will translate into improved socio-economic conditions within surrounding communities. - Better administration and co-ordination of government activities with improved road network. - Ensure that ongoing and transparent communication is maintained between SRL and the communities.
Influx	Influx of individuals to the project area for business, jobs and other opportunities made available due to the newly constructed bridge and improved road networks. This could put a strain on the local community facilities, e.g. health, education, water and sanitation, etc.	- It will be difficult to restrict influx into the project area during the operational phase. However, regular communication between SRL and the stakeholders will be implemented to ensure that SRL are aware of challenges faced by the communities.
Increase in Crime	With increase in movement to and within the project area, and development of new businesses, etc. there is a potential for crime to increase.	- Management of crime will remain the responsibility of the Sierra Leone Police Service. - Where crime is directly related to SRL's activities, contractors and/or employees, relevant disciplinary processes will be followed.

2.3 Environmental Management

In the context of a project, environmental management is concerned with implementation of the measures necessary to minimise or offset adverse impacts, as well as to enhance beneficial impacts. Unless the mitigation and benefit enhancement measures identified in the ESHIA are fully implemented, the prime function of ESHIA, which is to provide a basis for shaping the Project so that overall environmental performance is enhanced, cannot be achieved.

In order to be effective, environmental management must be fully integrated with the overall Project management effort at all levels, which itself should be aimed at providing a high level of quality control, leading to a Project which has been properly designed and constructed and functions efficiently throughout its life.

2.3.1 Environmental Management during Construction

Most of the Project environmental management activities will be carried out during the construction phase, since this is when most impacts can be expected to arise. Management will very largely be concerned with controlling impacts which may result from the actions of the contractor. In this respect, it is important to recognize that successful mitigation of construction impacts can only be achieved if the environmental protection measures, as set out in the construction contract, are properly enforced.

The environmental objectives of the contractor's EHS Plan to be submitted by the contractor include:

- Minimising incidences of environmental degradation that may result from Project activities, with special reference to the Project corridor, and
- Optimising environmental benefits which may result from the project.

2.3.2 Environmental Management during Operations

Continued enjoyment of the benefits arising from implementation of the Project will only be achieved if effective routine and periodic road and transmission line maintenance is carried out. Similar to during the construction phase, the contractor carrying out the repairs will be required to submit Environmental Management Plans which will be reviewed and monitored for compliance by the EHS Officer and the Project Engineer.

2.4 Occupational Health and Safety Aspects

All employees and contractors working for SRL are expected to be able to demonstrate OHS commitment in the workplace.

The objectives of the contractor's OHS plan include:

- To protect workers from health and safety hazards or risks in as far as is practicable. This could be done through the design of safe work systems, implementing relevant engineering controls, and where needed, administrative control measures. These may include, but not limited to, job rotation, training in safe work procedures, workplace monitoring, limiting exposure or work duration etc.;
- To prevent or reduce to a reasonable minimum, the incidence and severity of injury and spillages arising from working in or with hazardous chemical substances;
- To assist and facilitate the improved management of occupational health issues in and around the workplace, in a bid to enhance the protection of the general public and the environment.

2.4.1 Health and Safety Management during Construction

The management of OHS aspects during the construction phase will be similar to the management of environmental issues. The construction contractor will be required develop and implement and OHS plans to SRL, which will be approved and monitored for implementation by the Project Engineer and the assigned EHS Officer, throughout the construction phase.

2.4.2 Health and Safety Management during Operations

OHS management during operations will be required during maintenance and repair works. Similar to during the construction phase, the contractor carrying out the repairs will be required to submit OHS work procedures, which will be reviewed and monitored for compliance by the EHS Officer and the Project Engineer.

2.5 Community Health and Safety

The ESHMP has been developed to manage the activities associated with the haul road and transmission line project, which may lead to the occurrence of socio-economic issues and impacts discussed in the main ESHIA (Volume 1 of this report). The plan consists of a management strategy, broken up into recommendations that attempt to maximise benefits and minimise adverse impacts on the local communities.

The key objectives of this section of the plan is to:

- To identify appropriate mitigation measures to address socio-economic issues and impacts identified in the ESHIA, and
- To identify appropriate mitigation measures to address induced population growth resulting from a possible influx of newcomers into the area, attracted by the Project development.

The construction and operation of the haul road and transmission line may result in several community health and safety issues as is outlined in the ESHIA / ESHMP, including:

- Increased traffic in the affected communities which will increase the probability of road traffic accidents;
- Dust generation from increased vehicular traffic which will pose a threat to the health of the community members;
- Influx of employees, job seekers, and other new residents could result in the spread of diseases, including Sexually Transmitted Diseases (STDs) and HIV/AIDS;
- Influx of the people into the affected communities may encroach on the limited socio-economic facilities in the affected communities, thus placing additional strain on socio economic infrastructure and services, and
- Increased noise levels due to the increased movement of construction trucks, machinery and equipment in communities.

These will be managed in an integrated manner through the implementation of the ESHMP.

2.5.1 Community Health and Safety Management during Construction

The implementation of community health and safety management measures will be required throughout the construction phase. These aspects will be actively managed by the appointed contractor and SRL. As shown in the ESHIA, the majority of the potential community related health and safety impacts are expected to occur during the construction phase, and therefore, the integrated implementation of the recommended management and mitigation measures during this phase, will be crucial.

SRL have already appointed two dedicated Grievance Officers to the Project and have implemented a Grievance Management process, to facilitate direct communication between the community and SRL from the onset of the project.

2.5.2 Community Health and Safety Management during Operation

Ensuring community health and safety is maintained, will remain the responsibility of SRL management and sufficient budget will be made available in the Company's operational HSE budget. This will include *inter alia* ongoing dust suppression, traffic safety management, noise management and the mitigation of other potential operational impacts upon the communities.

Once the road, bridge and powerline have been constructed, the potential negative community impacts will reduce, and positive impacts, will increase. The CDAP outlined in Section 6 of this report, has been developed to ensure maximising community benefit from the project through the implementation of appropriate community projects.

2.6 Effective Organisation and Management Responsibilities

The primary responsibility for construction supervision and contract management, including environmental, OHS and community safety management during construction, will lie with the Project Engineer as defined in the construction contract.

Responsibilities for the management of EHS during all phases of the Project are outlined in the following sections.

2.6.1 Project Engineer

The Project Engineer will be responsible for establishing procedures and mechanisms for effective environmental and OHS management and monitoring. The Project Engineer will ensure that these are fully incorporated in, and integrated with, the overall construction supervision and monitoring framework.

The Project Engineer will have executive responsibility for ensuring that all management and monitoring aspects are dealt with promptly and properly.

Specific responsibilities include but are not limited to the following:

- The development and implementation of appropriate environmental, OHS and community health and safety risk control and management measures;

- Overall enforcement of an appropriate safety culture and practices;
- Maintenance of ESH records and statistics;
- Ensuring that accreditation and licensing requirements are regularly checked;
- Ensuring that ongoing monitoring and internal auditing is completed in a timely manner to appropriate standards;
- Where necessary implement any corrective action that may be required to continually improve management systems and
- Providing advice and support on all matters relating to the project.

Particular attention will be paid to establishing procedures whereby emergency action can be taken by SRL management in the event of the Contractor acting in a manner which may cause immediate and significant environmental damage (for example problems associated with interruptions to water supply, or contamination of land, groundwater or surface water through inappropriate handling of contaminating substances). Appropriate health and safety emergency preparedness and response will also be addressed in the relevant plans.

2.6.2 EHS Officer

It is recommended that an Environmental, Health and Safety (EHS) officer be appointed to specifically oversee the haul road and transmission line construction project. The EHS officer shall be a member of the construction supervision team, and would be the appointed individual responsible for ensuring that EHS measures are implemented during Project implementation.

- Specific responsibilities include but are not limited to the following:
- Conducting regular inspections and ensuring that EHS meetings and training are provided to workers;
- Review EHS policies and plans as required;
- Ensure compliance with legislation, Company standards and internal procedures;
- Provide advice and assistance to the Project Engineer on all aspects related to environmental, occupational and community health and safety management.
- Take action to immediately rectify any unsafe situations or acts, and undertake appropriate disciplinary action against persons who fail to comply with reasonable expectations;
- Prepare a list of emergency contacts;
- Maintain records on incidents;
- Maintain an inventory of safety equipment and supplies;
- Arrange for the replacement of used or obsolete safety supplies and equipment;
- Oversee first response programs;
- Ensure that adequate environmental controls are in place, as well as assist in cleaning up and remediating spills, and
- Report on environmental monitoring.

2.7 Training and Communication

The contractor will be responsible for ensuring that arrangements are made to ensure all personnel are suitably aware of EHS matters in carrying out their various activities. These arrangements will include providing training and experience in safe working behaviour, risk assessment, safety and environmental procedures and methods, and use of work equipment.

Ongoing training and communication will also be undertaken to ensure that all contractor employees are fully informed of community health and safety management requirements.

Effective communication systems are critical to minimizing risks and taking a proactive lead in the event of an emergency. Communication systems will include information on the site's safety plan, feedback on performance and actions taken, learning points to prevent injuries, etc. It is also crucial to display safety signs in strategic locations within the Project facilities.

2.8 Monitoring

The contractor will be monitored by the Project Engineer and the EHS Officer who will develop and implement an auditing program to monitor, evaluate and report on environmental, OHS and community health and safety performance and compliance.

3 WASTE MANAGEMENT PLAN

3.1 Introduction

The Waste Management Plan (WMP) is an essential component of the ESHIA and is designed to ensure the control and minimisation of potential sources of waste during the construction of the haul road and transmission line.

The WMP describes the proposed measures to be used to protect affected environmental and social receptors from adverse impacts associated with the generation of Project waste. The WMP considers:

- Proposed handling, storage and disposal methods, and
- Equipment and staff.

3.2 Objectives of the Waste Management Plan

The objectives of the WMP are to:

- Identify all potential sources of waste;
- Generate the least possible amount of waste through reduction, reuse and recycling practices, and review / approve all orders for materials, chemicals, and supplies to limit the environmental impact thereof;
- Protect the health and safety of workers and communities;
- Avoid or mitigate any potential negative impacts on all elements of the environment – including, but not limited to, people, flora, fauna, air, soils, surface and groundwater resources;
- Monitor waste generation, handling and disposal to assess whether waste management is being carried out as per the WMP and its associated directives;
- Avoid costly clean-up through prevention, and
- Ensure a logical and efficient plan for waste collection, sorting and disposal that reduces the number of times the waste is handled.

3.3 Waste Identification and Management

Waste streams likely to be generated during the construction phase and operational phase (routine repairs and maintenance) include the following:

- Construction wastes;
- Earthworks waste (spoils);
- Domestic wastes;
- Hazardous wastes;
- Electrical and electronics wastes, and
- Wastewater.

Management of each waste stream is discussed in the following sections of this plan.

3.3.1 Construction Wastes

Construction wastes include unwanted materials produced as a result of construction activities. This category of waste could include materials such as:

- Concrete;
- Wood;
- Packaging (cement bags, plastic, cardboard);
- Waste steel;
- Electrical wiring, and
- Nails.

Handling these wastes will start at the pre-construction stage where bills of materials quantities will be calculated. Calculations will be done in such a way as to limit the generation of scrap or unwanted materials.

Material re-use will also be enforced where possible to ensure that maximum use of available materials is made and limit as best as possible the materials which would have to be disposed of.

Segregation of wastes at source will be enforced through the provision of labelled waste bins, which will be stationed around active construction areas and at construction camps. These waste bins will be specifically for the disposal of solid, non-hazardous construction wastes.

3.3.2 Earthworks Waste (Spoils)

Spoils are unwanted and unusable rock or soil materials generated from earthworks. These can be in the form of unsuitable materials found along the road alignment e.g. clayey, silty soil, or excess materials excavated from borrow pits.

Spoils management will include the following options:

- Minimisation of spoils generation through design and management;
- Reuse of spoils within the Project where practicable;
- Beneficial reuse of spoils outside the Project for environmental and community works;
- Backfilling of borrow pits with spoils materials, and
- Disposal of spoils outside the Project for non-beneficial uses (landfilling).

Spoils generated will be temporarily stored at identified spoil sites until a decision of the final method of re-use or disposal is decided on. Spoils will not be stored in areas that are sloping or where surface runoff can easily wash away the materials.

3.3.3 Domestic Wastes

A variety of domestic waste materials will be generated during the Project which may include, but not be limited to the following:

- Aluminium, glass, plastic, paper, cardboard etc;
- Food and food packaging;

- Old tyres, hoses and rubber, and
- Fabrics and other domestic type wastes.

Workers will be required to consider re-use of materials where possible e.g. re-use of plastics, fabrics, tyres, etc.

Labelled waste bins will be installed in proximity to the work areas, as well as in the construction camps for the disposal of domestic waste. Wastes disposed of in the assigned bins will be further sorted before being transported to Area 1 for final disposal.

3.3.4 Hazardous Wastes

Hazardous wastes are materials considered reactive, flammable, radioactive, corrosive and/or toxic. The use of these materials will be limited to the extent possible. If use of these materials is unavoidable, procedures will be established for documentation and labelling as well as the safe storage, handling, and disposal of these materials.

Hazardous wastes that may be generated include the following:

- Batteries;
- Aerosol cans;
- Excess paints, thinners, solvents;
- Used oil, as well as oil / petroleum-contaminated soils;
- Pesticides / herbicides, and
- Medical wastes (first aid).

Hazardous wastes will be disposed of in the assigned hazardous waste bins / drums. Hazardous wastes will be packaged and labelled and transported to Area 1 for temporary storage, so that the appropriate final disposal method can be applied.

3.3.5 Electrical and Electronics Wastes

Electrical and electronics wastes (e-waste) may be generated during the construction and installation of the transmission line, as well as during routine repairs and maintenance. E-wastes will be disposed of in an assigned storage area.

Depending on the nature of the waste, whole equipment or equipment components will be assessed for the possibility of re-use. Where components can be harvested for re-use, the remaining non-electrical parts of the equipment (e.g. its carcass) can be disposed of in the domestic waste bins.

3.3.6 Used / Waste Oils and Hydrocarbon Contaminated Soils

Used oil from vehicles and machinery will be generated during their maintenance. Used oils will be collected and stored in containers which are not punctured and are properly secured to prevent accidental release into the environment and also prevent external materials (e.g. dust and water) from entering the oil.

Different kinds of used oils will be stored separately where necessary, to ensure that the best disposal option can be applied. Used oils may be re-used by mixing with fuels (e.g. diesel, marine, fuel oil, etc) for use in other areas of SRL's production e.g. boilers, combustion chambers, etc. Alternatively, the used oils may be sold or donated to companies who can use them in their processes in a responsible manner.

Soils contaminated with oil will be removed from the spill location, and bagged and labelled for disposal.

3.3.7 Wastewater

Wastewater will be produced through construction activities such as concrete wastewater (slurry). The construction contractor will be responsible for treating concrete wastewater if needed (i.e. settling of solids, neutralising high pH), before releasing the clean water into the environment.

Any hydrocarbon contaminated water will be treated using bioremediation.

Sewage will be collected by SRL through the use of a sewage truck (honey sucker) and transported to the Area 1 treatment facility.

3.4 Waste Storage

All wastes will be stored in an environmentally responsible manner. At a minimum:

- Clear, simple and pictorial signage will be provided to indicate where materials can be stored and any specific requirements for their storage;
- Labels and signage to indicate any dangerous or hazardous wastes stored;
- Waste storage areas will be located away from sensitive environments, drains or waterways;
- Waste will be covered to prevent dust, odours or rainwater ingress wherever possible;
- Wastes will be segregated where possible to allow for reuse / salvage opportunities. Hazardous and domestic waste shall be kept separate at all times, and
- Bins and other receptacles will be located such that there is adequate access and manoeuvring area for collection vehicles.

3.5 Waste Transportation and Disposal

The following handling procedures, developed based on IFC EHS Guidelines for Waste Management Facilities (2007), will be adopted as part of the Project's waste management program. Waste collection, handling, and transport guidelines include, but are not necessarily limited to, the following:

- A routine schedule will be established for domestic waste collection and disposal;
- Waste generators will be provided with appropriate waste disposal containers;
- Enclosed refuse vehicles or vehicles equipped with tarps will be used for the domestic waste collection;

- Waste handling will be minimized in as far practicable, and
- Waste containment will be maximized.

Odours and the loss of wastes will be monitored, evaluated, and reduced at all waste loading and offloading facilities. Litter (for example, plastic bags and paper) will be picked up, disposed of in the waste facility, and properly covered.

Wastes collected from the storage areas which cannot be re-used, re-purposed or recycled will be disposed of at SRL's Area 1 waste disposal facilities which include disposal by incineration or landfilling.

3.6 Management Responsibilities

3.6.1 SRL Management

SRL's Project Engineer and EHS Officer have the overall responsibility for ensuring the implementation of the WMP contained in this report.

Provision will be made for waste disposal receptacles which will be labelled and/or colour coded to enable waste segregation at source. Waste collection for disposal will be organised or overseen by the EHS Officer.

SRL will also ensure regular monitoring of the contractor's compliance with the waste management system established including, compliance with waste segregation, housekeeping along the route and especially waste storage areas, etc.

3.6.1.1 Waste Facility Record Keeping

The EHS Officer will be responsible for maintaining records, including types and volumes of wastes generated by the Project activities.

3.6.2 Contractor Responsibility

The construction contractor is responsible for ensuring that all workers are aware of the waste management procedures contained in the WMP. The contractor will liaise with SRL's Project Engineer and EHS Officer if there are any issues or challenges possibly preventing compliance with the plan e.g. unavailability of facilities (waste bins), irregular collection and disposal schedules, etc.

The construction contractor is responsible for providing training for workers in relation to waste management issues. Training will include but not be limited to:

- Waste segregation and its importance;
- Differences between wastes streams and an overview of incompatible wastes;
- Good housekeeping practices;
- Safe waste handling practices, and
- How to read and understand Safety and Data Sheets (SDS).

4 EMERGENCY RESPONSE PLAN

Emergency situations may arise from various activities and conditions which may occur during Project implementation, which may include accidents, natural disaster, civil unrest etc. These could have potentially severe consequences for the Project if no ERPs have been put in place.

4.1 Introduction

The ERP is an essential component of the ESHMP for this Project.

Procedures outlined for incident response, emergency and crisis management, are designed to enable all relevant parties associated with SRL to act quickly, decisively and cooperatively in any crisis or emergency situation. This ensures an appropriately measured level of response and recovery actions, depending on the nature, location and potential gravity of any given incident.

This document outlines the ERP for the haul road, bridge and transmission line construction including emergency plans, organizational responsibilities and reporting procedures.

As per SRL's existing incident classification system and procedures, the level at which an incident is declared, determines which response and recovery plans are implemented.

To be effective, the ERP will be clearly communicated to all SRL personnel and contractors. The following processes will be applied to ensure its effectiveness:

- Review the ERP with the construction contractor and their employees, to ensure that it adequately covers their activities;
- Review the plan on a regular basis to address new hazards or significant changes in site conditions, and incorporate lessons learned from previous incidents and exercises;
- Post the procedure in a conspicuous location, easily accessible to workers;
- Conduct drills and exercises on a quarterly basis to assess and improve upon emergency response, and
- Ensure personnel are competent and understand their roles and responsibilities during an emergency response situation.

4.2 Hazard Identification

The ability to identify hazards will go a long way towards preventing the occurrence of emergency situations. SRL will ensure that all staff are trained in hazard identification and that construction contractors' workers are similarly trained.

To identify and assess hazards, workers should be able to:

- Collect and review information about the hazards present or likely to be present in the workplace;
- Conduct initial and periodic workplace inspections to identify new or recurring hazards;

- Investigate injuries, illnesses, incidents, and close calls / near misses to determine the underlying hazards, their causes, and EHS program shortcomings;
- Group similar incidents and identify trends in injuries, illnesses, incidents and hazards reported;
- Consider hazards associated with emergency or non-routine situations, and
- Determine the severity and likelihood of incidents that could result for each hazard identified, and use this information to prioritize corrective actions.

4.3 Incident Classification

Incident classification will be undertaken in accordance with SRL's existing procedures.

4.4 Emergency Response Procedures

The following steps apply to almost any emergency and should generally be followed in addressing an emergency:

- Stay calm - Your example can influence others, prevent panic and thereby aid the emergency response;
- Assess the situation - Determine what happened and what the immediate emergency is. Assess what has happened to whom and what will continue to happen if no action is taken. Identify the cause that must be controlled in order to eliminate immediate, ongoing, or further danger;
- Take command – Using the established emergency communication protocol, contact the required person(s), internal or external depending on the crisis and protocol and explain the situation. Take any action that can be safely taken to eliminate or reduce the potential severity of the incident until professional help arrives;
- Provide protection - Protect victims, equipment, materials, environment, and accident scene from continuing damage or further hazards. Divert traffic, suppress fire, prevent objects from falling, shut down equipment or utilities, and take other necessary measures. Preserve the accident scene; only disturb what is essential to maintain life or relieve human suffering and prevent immediate or further losses;
- Aid and manage – Provide or arrange for the provision of first aid. Organize the workforce for both a headcount and emergency assignments. Direct all workers to a safe location or command post. This makes it easier to identify the missing, control panic, and assign people to emergency duties;
- Maintain contacts – Keep emergency services, SRL management and community authorities (if required) informed on the situation, and
- Guide emergency services – Meet services on site. Lead them to emergency scene. Explain ongoing and potential hazards and cause(s), if known.

4.4.1 Fuel / Oil Spillage

In the event that a leak, spill, tank rupture, or other release occurs, the following procedures would be followed:

- Avoid danger to yourself and others (i.e. stop working, shut off power sources and any moving machinery and equipment as before, alert others in the area of danger);
- Stay upwind of the emergency scene;
- Identify the product that has been spilled, as well as immediate potential hazards (such as possible contact of the spilled material with equipment or other chemicals, or entry into a waterway);
- If the identification of the substance cannot be determined, assistance should be requested, and the identification of the substance should be determined by qualified personnel;
- If possible to do safely, prevent spill from entering waterways / spread into the environment;
- Assess spill quantity and characteristics;
- Notify the EHS Officer / Project Engineer with as much information as possible, and
- Arrange for a timely clean-up of spilled material by contacting the EHS Officer.

4.4.2 Fire / Explosion

Staff / workers assigned as first responders will be trained in first aid, fire rescue, evacuation, and working in closed and/or oxygen deficient space. The fire rescue training will include annual training sessions comprised of the following:

- Activating the fire suppression system;
- Performing drills to put out fires, and
- Responding to practice rescue scenarios.

In the event of a fire or explosion, the following procedures shall be followed:

- Assess the location and severity of the situation;
- Extinguish the fire if it can be accomplished without being exposed to potential hazards;
- Activate the emergency warning system;
- Restrict access to the area;
- Do not take health or safety risks by entering unstable or fire engulfed areas;
- Notify the EHS Officer and Emergency Response Teams according to establish protocols, and
- Assist in extinguishing the fire and securing the area only under the direction of the designated first responders.

4.4.3 Natural Disaster (Land Slide, Flooding)

During a regional / national level natural disaster, information on the nature, scale, location or direction of the emergency will be obtained from national disaster management services either through public media or direct communication between SRL and the related organization.

Information will be disseminated to employees and contractors on whether they should stay indoors or gather at evacuation points for headcounts and safe evacuation.

Emergency response teams under the supervision of the EHS Officer, will organise headcounts and evacuation as may be necessary.

4.4.4 Road Accidents

In the event of a road accident involving SRL employees or contractors, the following procedures will be applied:

- SRL EHS Officer will be contacted immediately with details of the location and nature of the incident;
- SL Police will be contacted immediately with details of the location and nature of the incident;
- The accident site will be cordoned off to keep the public at a safe distance from the scene and to allow easy access for first responders and emergency services;
- If it is safe to do so, first responders under the guidance of the EHS Officer will remove victims of the crash, and place them in an area where they can receive first aid treatment and assessment. Victims should be moved as little as possible until the extent of their injuries is determined;
- Vehicles involved in the crash are not to be moved until the police arrive;
- Victims will be moved to the SRL clinic for further treatment and to a government hospital or medical centre if required;
- If members of the public are involved in an accident which has occurred as a result of an SRL employee or contractor, the injured persons will either be taken to the SRL clinic or to the closest Government Hospital for treatment, depending on their injuries;
- Details of the accident including how it was caused, number of persons involved, police reports, etc will be recorded by the EHS Officer.

4.4.5 Falling from Heights

Falls from heights may occur where workers are involved in transmission line installation and bridge construction. This scenario, while having been mitigated through the provision of appropriate working at heights procedures, including the use of safety harnesses and OHS training, could still potentially occur. Where necessary, rescue from heights procedures will be followed to retrieve the person. Fall victims will be treated with first aid in the location of their fall until possible injuries are identified, and he/she can be safely moved to the SRL clinic or other medical facility for further treatment.

4.4.6 Drowning

Construction workers involved in the construction of bridges and culverts will be at risk of falling into the water. This scenario, while having been mitigated through the provision of life jackets, use of safety harnesses and OHS training, could still potentially occur. In the event of a worker having fallen into the water and is struggling to stay afloat, the following should be done:

- First aiders should be summoned to the site immediately;
- At least 2 personnel who are strong swimmers, with the correct floatation PPE on, should approach the victim to attempt rescue;
- Once removed from the water, first aiders will administer the following first response techniques if needed:
  - Check whether the person is breathing;
  - If there is no sign of breathing, check for a pulse, and
  - If there is no sign of a pulse, administer Cardio Pulmonary Resuscitation (CPR).
- Once revived, the victim will be moved to the SRL clinic for further treatment if required.

4.4.7 Electrocution

Even though no energizing of power lines is scheduled during the construction phase, all work should be subject to SRL's isolation procedures. The installation and repair of transmission lines involves possible contact with potentially lethal electrical voltages and currents. No attempt to install or service the system will be made by anyone who is not a qualified, trained technician familiar with electrical infrastructure and installations.

Precautions while in an active electrical work area:

- All work shall be undertaken in accordance with SRL approved work procedures, based on a comprehensive risk assessment;
- All workers shall wear suitable insulating PPE when handling or working with electrical equipment;
- At least two persons will always be present when work is being carried out on electrical equipment. No attempt will be made to service or adjust unless another person capable of rendering first aid and CPR is also present;
- Any accidents will be immediately reported to the SRL Project Engineer and EHS Officer.

In the event of an electrocution emergency:

- Assess the situation and ensure safety of yourself, the casualty and others;
- Turn off the power;
- If the power cannot be turned off, stand on a dry insulated surface (rubber mat, etc.) and use a non-metal object to move the casualty away from danger, and
- Once the casualty has been moved out of harm's way, immediate medical response will be administered.

4.4.8 Structural Collapse

Collapse of structures may occur such as scaffolding, bridges, transmission line poles / towers, etc. This could result in destruction of equipment, personal injury and even death. In an emergency of this nature, trained first responders will immediately be notified.

Untrained personnel will be prohibited from entering the affected area to prevent any further injury.

The trained responders will be responsible for determining the structural safety of the rescue area and the appropriate rescue techniques to apply. If the situation is perceived to be too dangerous, external assistance will be requested (e.g. SL Police, SL Army).

The following steps will be taken in handling the situation:

- Rescued personnel will be taken to the first aid station / SRL clinic to receive immediate medical attention;
- A headcount of workers in the area of the emergency will be done to ensure that everyone is accounted for;
- An investigation will be conducted into the cause of the collapse, and
- An audit of equipment, machinery, construction materials lost to the incident will be conducted.

4.4.9 Minor accidents (scrapes, cuts, abrasions etc.)

Minor accidents will be treated through first aid. If an employee / worker realises that he/she has been injured, no matter how insignificant they may perceive it to be, he/she should stop the job being carried out to seek first aid treatment.

Seemingly small injuries like cuts and abrasions may become worse if they are exposed to external elements such as dust, oils, fuel, heat, etc. and may become infected leading to bigger health problems.

First aid boxes will be provided in all work areas, and trained first aiders will be available in close proximity to all work areas.

4.4.10 Medical Health Cases

First response medical attention to accidents or emergency health cases will be provided through first aid and/or transfer to SRL's on site clinic. Where advanced medical attention is required, the closest Government Hospital or medical centre will be contacted for transfer of the victim; if necessary, the victim will be transferred to Freetown for further treatment.

In the event of a medical emergency or fatality, the following procedures will be followed:

- The SRL clinic will be notified immediately and medical treatment administered;
- Management will be informed of the incident resulting in the medical emergency;
- The location and severity of the situation will be assessed;
- Further health or safety risks like entering a dangerous or unstable area will be prevented;

- Should an employee require emergency off-site medical transportation, they will be accompanied by a staff member of the closest medical facility to give pertinent information about the incident, and
- In the event of death, only a professional medical practitioner can confirm the death. Immediate notification of SRL management is required after the death of any employee from a work-related incident.

4.4.11 Civil Unrest and Disturbance

A PCDP has been developed that includes procedures for dissemination of information to the public, stakeholders, and non-government organizations.

Despite this proactive approach, social unrest could occur for a number of reasons outside of the Project management's control. Subversive activities by workers or non-workers could develop and may result in violent or non-violent protests, attacks on Project personnel, property damage, or even hostage taking.

The SRL management is to be notified immediately by employees / contractors of any social unrest that may present a threat to themselves and/or the facility. Response protocols based on pre-determined plans will be implemented.

4.5 Emergency Resources

It is important to identify which resources are available and have contingency plans in place to make up for any deficiencies. The most important resource is a communications system.

It is also important be familiar with the facilities available, or any limitations. Resources such as fire extinguishers, spills containment equipment, and first aid kits must be maintained and clearly identified. Construction equipment may be included among potential emergency resources.

In situations where outside resources are so far away that an adequate response is not possible, resources may have to be obtained and kept on site e.g. fire protection or ambulance / medical resources. Whatever the situation may be, people, equipment, facilities, and materials are needed for emergency response; it is important to determine in advance where these resources will come from. Staff assigned to supplying or providing these resources will be made aware of their role in the plan.

4.6 Communication Systems

An important key to effective emergency response is a communications system that can relay accurate information quickly. To do this, reliable communications equipment must be used, appropriate procedures developed, and personnel trained and responsibilities properly defined.

4.6.1 Internal Communications

The internal communication system is used to convey safety information to workers in danger, and maintain site control. Mobile phones and two-way radios are used when work teams are working away from the main internal communication system (alarms, signals and intercoms). Training on the internal communication systems will be provided to all employees and contractors as part of their orientation program.

4.6.2 Communications During an Emergency

In case of an emergency, immediate notification of appropriate individuals will be actioned. In the event that there is a need for the timely and rapid notification of local communities, the first-responder will immediately contact the EHS Officer who will immediately contact key members of management teams. This will trigger the appropriate emergency notification system that will be developed.

The EHS Officer will prepare a list of emergency contact numbers within the company, locally (within the community) and nationally as may be appropriate. Training will be provided to workers and contractors on the communication protocol in an emergency.

4.6.3 Communications with the Public

The EHS Officer, in collaboration with the Community Relations Manager (CRM), will be responsible for all site and local communications with the public. As required, meetings will be held to disseminate information related to on-site emergencies. The existing Chiefdom Grievance Committee shall be used for communication regarding emergencies. The EHS Officer will coordinate with the CRM on the incident and advise on what information should be released to the public, government officials and other interested parties.

In providing information to the public, the EHS Officer and CRM will provide information on the following:

- Description of the event;
- Identification of the population that might be affected;
- Description of any injuries and disposition of those involved in the accident;
- Identification of any existing hazards;
- Description of precautions taken to limit future risks;
- Identification of water source contaminated (if any);
- Description of mitigation measures that are proposed or have been taken to correct the problem, and
- Contact information.

Waiting and briefing areas for family / relatives of those involved in serious accidents will be established. Food as well as a sitting / sleeping area will also be provided to members of the family and relatives as appropriate.

4.7 Emergency Drills

Periodic testing of emergency procedures will be performed to ensure that the Company and external emergency services can appropriately respond to emergency situations.

Testing of emergency procedures will involve external emergency services providers, where appropriate, to develop an effective working relationship. This can improve communication and cooperation during an emergency.

Emergency drills can be used to evaluate the company's emergency procedures, equipment and training, as well as increase overall awareness of emergency response protocols. Internal parties (e.g. workers) and where possible, external parties (e.g. SL Police), will be included in the drills to increase awareness and understanding of emergency response procedures.

Records of emergency drills will be kept including information on the scope of the drill, a timeline of events and actions and observations of any significant achievements or problems. This information will be reviewed for improvement.

4.8 Organization and Management Responsibilities

SRL's EHS Officer will coordinate emergency response training of employees and contractors. This will include the setting up of Emergency Response Teams who will be trained in emergency equipment use and emergency response methods. The Emergency Response Team members will be trained in transportation of hazardous materials; fire-fighting; spill control and mitigation; first aid; and personnel rescue techniques.

On site emergency personnel, who have roles in addition to their ordinary duties, will have a thorough understanding of emergency response procedures. Training will be directly related to their specific emergency response roles, and will include:

- Emergency chain-of-command;
- Communication methods and signals;
- How to call for help;
- Emergency equipment and its use;
- Emergency evacuation;
- Removing injured personnel from enclosed spaces / from height, and
- Offsite support and how to use it.

Emergency personnel will receive training in first aid and CPR and will practise hands-on rescue techniques on at least an annual basis. Training will also include recognizing and treating chemical and physical injuries, as well as heat stress.

5 ROAD SAFETY MANAGEMENT PLAN

5.1 Introduction

Road safety precautions must be put in place to help prevent drivers on the road from causing unnecessary accidents and at the same time, helping pedestrians and cyclists understand the rules governing their safety on the haul road. This road safety management plan details the road safety and traffic management principles; strategies and measures that will be applied; road user requirements, including provision of a safe environment for the travelling public; and minimising impacts on the road network. Specific community / stakeholder consultation process and community relations strategies for managing changed traffic conditions will be highlighted. It is however recognised that SRL is not the sole user of this road and that road management is within the purview of several Ministries, Departments and Agencies including the SLRA and the SL Police.

The legal and regulatory framework to be taken into consideration for a road construction Project has been outlined in Volume 1 of this report: The ESHIA.

5.2 SRL Road Safety Management and Mitigation Measures

SRL will strive to ensure reasonable steps are taken to assist with ameliorating problems through collaborative efforts with other stakeholders. While the Company will not attempt to take on government's responsibilities as service provider, it will however take steps to ensure full compliance of its personnel with relevant national laws relating to road traffic and safety.

The Company commits itself to complying with local road safety regulations including:

- Ensuring that all vehicles are road worthy at all times;
- Displaying of motor vehicle licence;
- Ensuring that employees are certified as being competent;
- Fitting motor vehicles with spare tyres, reflective triangles, fire extinguishers, etc.;
- Ensuring driving mirrors and seatbelts are in good condition;
- Driving within speed limits;
- Observing the rules of the road;
- Ensuring marks on all vehicles are clear and legible, and
- Reporting road accidents in a timeous manner.

5.2.1 Specific Road Safety Measures to be Implemented

5.2.1.1 Road Safety Education, Promotion and Awareness Campaigns

Road safety awareness programmes will be developed for the community to cover a range of subjects, including understanding vital road signs, pedestrian crossing, etc. as to address the general lack of awareness of road safety matters in communities close to road alignment. Company drivers will be provided with appropriate training. Company driver training will

take place within the company's premises, and community awareness programmes held in the communities themselves for a range of stakeholders including traditional leaders, women, youth, traders etc.

Where necessary, awareness programmes may be conducted in collaboration with sector stakeholders including:

- SL Police;
- SLRSA;
- SLRA;
- Motor Drivers' Union, and
- Bike riders' Associations.

SRL's EHS Officer will be responsible for drawing up awareness and training programmes. The CRM will, in collaboration with the EHS Officer, organise the participation of community stakeholders in awareness / training programmes.

5.2.1.2 Training to Improve Competence of Drivers

Training programmes for Company drivers will be organised on various matters which include improving driving skills, control of vehicles, physically securing loads etc.

Possible collaboration and implementing partners include:

- SL Police, and
- SLRSA.

SRL's EHS Officer will be responsible for drawing up awareness and training programmes.

5.2.1.3 Vehicle Standards and Maintenance

Vehicle maintenance must be undertaken to the required standard, to ensure that vehicles are road worthy, as well as to minimise breakdowns and accidents. It will be ensured that vehicle maintenance standards are uniform, and that testing is frequent. The vehicles will also be regularly checked for tyre wear, mirrors, fire extinguishers etc.

The SRL Project Manager or equivalent member or staff will be responsible for regular vehicle checks, record maintenance, etc. The EHS Officer will conduct periodic safety checks on vehicle safety features like fire extinguishers, tyre condition, mirror condition, etc.

The Company will operate a sensible vehicle replacement programme in which vehicles will be replaced at intervals determined by relevant factors.

5.2.1.4 Monitoring and Enforcement

Management measures put in place by SRL need to be monitored for effectiveness. The monitoring programme will involve all company drivers from professional drivers to other personnel who drive company or private vehicles. For company vehicles, appropriate measures including vehicle logs, fuel monitoring, specialist monitoring equipment will be put in place. Sporadic snap checks on drivers along certain routes will also be done.

5.2.1.5 Human Factors

A whole host of human factors may cause accidents. These include speeding, alcohol consumption and fatigue. The Company has strict guidelines related to these and adopts a zero-tolerance approach towards defaulters. Random alcohol tests are conducted on all workers including drivers. Reasonable restrictions in respect of driving hours during night time will be implemented.

5.2.1.6 Training in Handling Hazardous Materials

Though not usual, it is possible for Company vehicles to occasionally carry hazardous materials. These may include chemicals and fuel. Fuel supply companies also supply fuel by road tankers that may be susceptible to accidents. Fuel supply companies supplying SRL will be compelled to comply with the health and safety precautions established for the transportation and offloading of fuel within SRL's concession areas. A select group of company drivers will be trained in handling of hazardous substances.

5.2.1.7 Collaboration with Local Law Enforcement Officers

Law enforcement officers usually check for various offences including speeding, reckless driving, alcohol use, seat belt usage, use of mobile phones while driving etc. which complement the efforts of SRL. They also assist the Company in various monitoring issues along the route and in the community.

5.2.1.8 STDs and HIV/AIDS Awareness

Increased traffic along the route may lead to social problems related to vulnerability of young girls / women to sex. Training in safe sex practices and STDs and HIV/AIDS awareness will be provided for the drivers and vulnerable groups along the route.

5.2.1.9 Road Inspection and Maintenance

SRL will carry out road inspections occasionally involving regular, systematic, on-site inspection of the haul road. Detected hazards and safety issues will be reported and addressed. Black Spot Management (BSM) consisting of identification, analysis and treatment of areas most susceptible to accidents will be carried out.

6 COMMUNITY DEVELOPMENT ACTION PLAN

6.1 Introduction

SRL have established a Community Development Committee (CDC), which comprises of leadership and management of all its Project Affected Communities.

The CDC is mandated to perform its duties under the SRL Community Development Agreement (CDA). Funding to execute its mandate is provided by SRL in the form of the Community Development Fund (CDF).

The two Chiefdoms through which the road will be constructed, are already represented on the CDC.

The CDC represent elected members of the Project Affected Communities and include:

- The Chairmen of Bonthe and Moyamba District Councils;
- Two Paramount Chiefs, one each from Bonthe and Moyamba Districts;
- Two Chiefdom Youth Leaders, one each from Bonthe and Moyamba Districts;
- Two Chiefdom Women's Leaders, one each from Bonthe and Moyamba Districts;
- Two Chiefdom Landowners representatives, one each from Bonthe and Moyamba Districts;
- One representative from Civil Society Organisations, and
- Four members of SRL's management, including its CEO, COO, the EHS Manager and the Community Affairs Manager.

The CDC is mandated to identify and implement community development projects in all Chiefdoms, including the Bagruwa and Lower Banta Chiefdoms. The following towns are considered to form part of the Project Affected Communities: Gbangbatoke, Bengelow, Moporhoi, Momassa, Moseilolo, Mosenegor, Moyasa, Fula Town, Ngiebu, Kasama, Komendeh, Kamatipa.

The CDC have *inter alia* the following functions:

- Receive, appraise, select, monitor and evaluate all project proposals from the Project Affected Communities;
- Make the final decision for the award of contracts for services to be delivered under the CDA;
- Provide guidance for those directly involved in the projects on project planning, implementation and management;
- Address any issue that has major implications for the Project;
- Organize meetings with the Project Affected Communities to discuss pertinent issues relating to their welfare and consult where relevant to CDC decision-making under the CDA;
- Explore ways to promote community development funding and investment opportunities for the Project Affected Communities beyond the Operator and the CDF.

6.2 Purpose and Objectives

The key objective of the CDAP is to provide opportunities for long-term community and economic development programmes for Project Affected Communities, including the development of initiatives in the 12 affected communities.

It should be noted that while community health and safety measures and livelihood restoration are described in this section of the report, managing this element remains the responsibility of SRL. Budget in this regard has been included in the SRL operational expenses.

6.3 Some Planned Initiatives

SRL has developed this CDAP in order to implement initiatives aimed at assisting in the improvement of the living conditions of the Project Affected Communities. The plan consists of a management strategy, broken down into recommendations that attempt to maximize benefits and minimize adverse impacts on local communities.

6.4 Implementation Plan

6.4.1 Initiatives Selected for Implementation

Planned initiatives forming the basis of this CDAP are:

- Support to education;
- Support to livelihood restoration for identified farmers, and
- Community health and safety initiatives, including community awareness and sensitisation programmes.

6.4.1.1 Support to Education

SRL encourages the CDC to focus its attention and resources on education related community projects. This could include support to establish a STEM (science, technology, engineering and mathematics) focused wing at a secondary school in the area, and providing scholarships for attendance to JADA vocational institute. The exact nature of relevant projects cannot be determined at the time of compilation of this report, as a consultative process between the CDC and the Project Affected Communities will need to be undertaken, following SRL obtaining project approval from the SL-EPA.

6.4.1.2 Livelihood Restoration

Where farmers are identified that have been affected by land clearance, to the extent that crop compensation is inadequate to ensure the ongoing sustainability of their livelihoods, an appropriate and tailored livelihood restoration plan will be implemented for such farmers. Livelihood restoration planning will follow the SRL Resettlement Action Plan and actual costs associated with this process, can only be confirmed once the exact extent of livelihood restoration has been confirmed.

6.4.1.3 Community Health and Safety

The construction and operation of the haul road and transmission line may result in several community health and safety issues including:

- Increased traffic in the affected communities which will increase the probability of road traffic accidents;
- Dust generation from increased vehicular traffic which will pose a threat to the health of the community members;
- Influx of employees, job seekers, and other new residents could result in the spread of diseases, including Sexually Transmitted Diseases (STDs) and HIV/AIDS;
- Influx of the people into the affected communities may encroach on the limited socio-economic facilities in the affected communities, thus placing additional strain on socio-economic infrastructure and services, and
- Increased noise levels due to the increased movement of construction trucks, machinery and equipment in communities.

As such, a detailed implementation programme in respect of community health and safety will be developed, to address the management / mitigation measures outlined in this ESHMP, including initiatives such as dust monitoring and suppression, noise mitigation / management, road safety management initiatives, etc.

The PCDP requires regular meetings with and awareness / sensitization programmes for communities on issues pertaining to their health and safety including road safety; STDs; HIV/AIDS; teenage pregnancy; and other relevant issues. As stated, to ensure that management and mitigation measures implemented achieve SRL's standards, these matters will remain under the management of SRL its operational budget.

6.4.2 Organizational Responsibility and Function

The overall implementation of the CDAP will be funded by SRL under the CDF.

Community health and safety management, livelihood restoration and community awareness / sensitisation programmes, remain the responsibility of SRL as part of its operational cost.

Community development projects identified by the CDC to be implemented in the Project Affected Communities in respect of educational support, will be managed by the CDC, who will be responsible for disbursement and management of funds during implementation of the proposed community development projects under the CDF.

6.4.2.1 Budget

SRL is committed to the highest standard of environmental, health, safety and social care. As such, SRL will conduct a comprehensive investigation into the practical implementation of the management and mitigation measures outlined in this ESHMP, including in respect of this CDAP. This will be undertaken in consultation with various service providers, where necessary the CDC, and the Project Affected Communities in respect of the community development initiatives. Following these investigations, a comprehensive budget planning

process will be undertaken to ensure that adequate budget is provided for the implementation of this ESHMP and CDAP.

This information will be utilised as part of reporting to the EPA-SL in respect of SRL fulfilling its financial obligations under this ESHMP and CDAP.

The implementation of management, mitigation and community development initiatives will commence in 2018.

6.5 Monitoring and Evaluation

Monitoring will be undertaken quarterly and annual reports will be submitted to the EPA-SL.

7 PUBLIC CONSULTATION AND DISCLOSURE PLAN (PCDP)

A PCDP is designed to provide local residents, Non-Government Organizations (NGOs), government and other interested parties with Project information and to allow those stakeholders to participate in the planning process. Stakeholder participation encourages sustainable growth by accounting for community needs as they relate to the proposed project. Development of sustainable programs will help to maintain long-term Project viability. A PCDP incorporates public meetings for stakeholders to air Project concerns and to ensure that during different phases of the project, benefit stakeholders by allowing them to voice their opinions, make suggestions, meaningfully influence the process of Project development, and keep them (stakeholders) informed of current updates on Project information.

7.1 Objectives of PCDP

The objectives of a PCDP are:

- To disseminate relevant Project information to stakeholders / affected communities and to document any concerns / issues from such stakeholders;
- To improve communication between SRL Project management and affected communities;
- To document public consultation events, and
- To disclose selected Project documents to affected communities / stakeholders.

The main objective of the PCDP is to establish a program for multi-directional communication between SRL and stakeholders. To meet this objective, this plan provides the following:

- Outline of IFC requirements for public consultation and disclosure;
- Identification of key stakeholders in the Project area;
- Description of the resources and the responsibilities of PCDP implementation, including receipt and response to grievances, and
- Descriptions of how data will be collected and maintained, in order to adequately monitor and report the effectiveness of the PCDP.

7.2 Resources and Responsibilities

The CRM reports directly to the SRL Project Manager and will be responsible for the public consultation and disclosure program. He/she will also be responsible for coordinating with SRL's EHS Officer on all community relations, public consultation programs and dispute resolutions.

Other responsibilities and duties of the CRM may include the following:

- Identifying when meetings are necessary and scheduling them;
- Circulating or publicizing agendas and local advertising;
- Inviting specific individuals to meetings;
- Attending and documenting meetings;
- Directing any required follow up, and
- Working with NGOs and the CDC to develop, plan and implement sustainable development projects as shown in the CDAP.

Follow-up work on the above may include additional meetings, arranging for specialized consultants, or bringing specific issues to the SRL Project Manager and ensuring that appropriate actions are taken.

7.2.1 Stakeholders

Public consultation and disclosure initiatives need to target all stakeholders listed in the CDAP to keep them informed of Project plans and of any substantial changes that may be made to its design or operations.

7.2.2 Consultation and Disclosure Program

The consultation and disclosure program is aimed at informing the stakeholders of Project plans and activities in a manner that promotes open dialogue among all interested parties, but particularly those that are or will be affected by the Project. The program allows directly affected parties to have meaningful input in the decision-making process regarding the development of the Project and the mitigation of impacts that will affect them. Meetings will be scheduled, and informational materials disseminated as needed, to keep people informed and to maintain Project transparency. It is the responsibility of the EHS Officer, along with the CRM, to ensure that the program objectives are accomplished.

- The EHS Officer, with the CRM and the CDC will be responsible to build relationships with the surrounding population and communities and to collect and disseminate information;
- Public and individual meetings will be held on a regular basis to provide a forum for open communications;
- Relationships will be built with Government offices (local, regional, and national levels), affected community authorities and the CDC and their participation in consultation meetings will be encouraged to facilitate communications, and
- Formal meetings with individual stakeholders and SRL personnel will be held as needed to assure follow up and confidentiality on identified issues and concerns.

7.2.3 Notification for Meetings

Stakeholders will be informed about the Project and its activities through some or all of the following methods:

- Mass media (newspapers, newsletters, posters, radio, television);

- Direct communication in local languages;
- Direct mail;
- Open-houses (field offices, Project site);
- Illustrated pamphlets and newsletters;
- Public meetings, and
- Informing appropriate community leaders.

A two-week notice, followed by a three-day reminder notice will be provided for such meetings.

Minutes of consultation meetings will be made available to the meeting participants and other identified interested parties within two weeks from the meeting date. Minutes will be written in an understandable manner and can be obtained from the Project office or other location agreed.

7.2.4 Grievance Mechanisms

Despite the best public consultation and community relations efforts, inevitably there will be circumstances that arise where the Company and stakeholders disagree.

A formal process or plan for receiving and responding to grievances has already been by SRL, with two Grievance Officers appointed for the Project area. This plan addresses the following requirements:

- All grievances will be documented into a central registry or filing system at SRL offices;
- Receipt of all grievances will be acknowledged, by letter or other means, as soon as possible, and no later than 7 days after receipt;
- The grievance will be reviewed by the Grievance Officer and will be supported by the CRM to determine the relevant and appropriate actions to be taken or implemented;
- Multiple grievances by the same person, or different persons which address the same or similar issue, will be considered together and will warrant additional attention;
- Regular reporting to the Chiefdom Grievance Committee will be undertaken, including summarizing summary of grievances received, actions taken, and any outstanding issues to be addressed;
- Relevant (non-confidential) information will be disclosed to the public, and
- If necessary, the relevant Government authorities will be notified to share information and address Sierra Leone policy or regulation issues.

7.2.5 Reporting

The SRL Project Manager, through his/her EHS Officer and CRM, has the primary responsibility for all public consultation and disclosure monitoring and reporting. The CRM will report on the monitoring of community development projects. This will be reported periodically as part of the regular EHS monitoring programs.

Additional reports may be developed and provided to the local communities and identified stakeholders on a case-by-case basis. This will primarily be through the feedback at regularly

scheduled meetings. Copies of these reports will also be provided to the relevant government agencies of Sierra Leone such as the EPA-SL.

Information sheets and posters may be appropriate for reporting on some items and issues. Radio broadcasting and/or direct communication may be used for Project updating in the affected communities which have a low literacy rate.

8 CONCEPTUAL CLOSURE PLAN (CP)

8.1 Objectives

The primary objective of a conceptual closure plan is to ensure the environmental and community health and safety of an operational area once operations have ceased. This Project involves two phases which require closure – the construction phase and operational phase.

Closure of the construction phase will involve ensuring that all construction materials, waste, equipment, etc. are cleared away from the haul road and transmission line, all borrow sites and waste disposal sites closed, and the site rendered safe for public use.

Closure of the operational phase usually involves converting the Project area to as close to its natural / original state as possible. Following cessation of operations, disturbed areas are required to be stabilized and reclaimed to an alternative land use that will provide income opportunities for local communities within the Project area. This however is not the case at the end of SRL's operations the haul road and transmission line as the haul road will be handed over to the SLRA as the route will continue to serve as a major road connecting Moyamba and Bonthe Districts to the rest of the country. The transmission line will be handed over to the Ministry of Energy.

8.2 Post Construction Decommissioning

Closure of the construction sites along the route will be the responsibility of the construction contractor who will be required to submit a post-construction rehabilitation / restoration plan.

Decommissioning of construction and related sites will involve the following aspects which should be covered in the construction contractor's rehabilitation/restoration plan:

- Removal of construction vehicles and equipment, including the explosives magazines;
- Backfilling, where possible, of all borrow pits using excess excavated soils and spoils. All borrow pits must be shaped to be free draining, safe, stable and in a non-polluting state, and where practicable be re-vegetated as may be appropriate;
- Removal of all waste receptacles and disposal of stored wastes;
- Remediation of oil spill areas;
- Dismantling of all temporary structures: work sites, storage areas, etc., and
- Removal of all fuel tanks and related structures along the route.

8.3 Post Operation Decommissioning

Post operation decommissioning will be the responsibility of SRL. The following approach will be taken:

8.3.1 Haul Road

At the end of SRL's operations, the haul road will be handed over to the SLRA as the route will continue to serve as a major road connecting Moyamba and Bonthe Districts to the rest of the country. The responsibility for road maintenance and upgrades will be transferred to the SLRA.

SRL will however be responsible for ensuring that all Company equipment, machinery, and unusable structures along the route are cleared away before the road is handed over.

8.3.2 Transmission Line

Similar to the haul road end of life plan, the transmission lines may likely not be uninstalled. The best long-term option for utilisation of the powerline will be investigated

9 MANAGEMENT, MITIGATION, MONITORING AND IMPLEMENTATION MEASURES

9.1 MONITORING PLANS

Environmental and social monitoring is an essential element of environmental and social management, as it provides the basis for rational management decisions regarding impact control. The monitoring program for the Project will be undertaken to meet the following objectives:

- To check on whether environmental and social mitigation, management and benefit enhancement measures have actually been adopted, and are proving effective in practice;
- To provide a means whereby any impacts which were subject to uncertainty at the time of preparation of the ESIA, or which were unforeseen, can be identified, and to provide a basis for formulating appropriate additional impact control measures, and
- To provide information on the actual nature and extent of key impacts and the effectiveness of mitigation and benefit enhancement measures which, through a feedback mechanism, can improve the planning and execution of future, similar projects.

The following monitoring plans are proposed:

9.1.1 Climate

Climate monitoring will be carried out on site in order to detect changes in weather patterns throughout the operation. To do this, a weather station will be installed at a suitable location.

9.1.2 Noise Monitoring Plan

Noise monitoring will be overseen by SRL's EHS Officer and depending on the intervals of the monitoring programme, reports will be compiled and submitted to management to ascertain compliance with the required standards. Management will be advised of any significant increase in the ambient noise levels as operations continue. During the construction phase, the construction contractor will be notified of any noise level exceedances. Where noise levels exceed the allowable limits, appropriate action shall be taken to reduce noise levels fall within the said limits. Where all mitigation measures recommended in this study are being applied and noise levels are still high, additional measures to reduce levels to within acceptable limits will be investigated.

9.1.3 Air Quality Monitoring Plan

Based on the predicted impacts on the surrounding environment, it is recommended that ambient PM_{10} monitoring be done and a dust fallout monitoring network established on a continuous basis during the construction and operational phases. This will be done with the aim of ensuring that dust levels are maintained within acceptable levels for the safety of workers and the general public. Point sources of dust generation will be identified and during the construction phase, the contractor will be notified to take remedial action.

9.1.4 Groundwater Monitoring Plan

A groundwater monitoring plan is proposed during the construction phase of the project. Monitoring will be carried out to assess whether changes are occurring to the ambient (baseline) water quality of local groundwater sources, either as a result of operations, or contamination from surrounding activities. Where significant changes are noticed, the source of the contamination or change in waste quality and/or quantity will be identified and remedial action taken. Mitigation measures to prevent recurrence will be taken.

9.1.5 Surface Water Monitoring Plan

Surface water monitoring should be implemented during the construction phase to prevent (and through mitigation reduce) negative impacts on the surface water resources. The plan should be reviewed regularly as the operation progresses in order to address any deviations arising from the Project description. Where significant changes are noticed, the source of the contamination or change in waste quality and/or quantity will be identified and remedial action taken. Mitigation measures to prevent recurrence will be taken.

9.1.6 Soil Management and Erosion

Management of spoils sites, borrow pits and erosion issues will need to be monitored throughout the construction phase to ensure that measures put in place to prevent environmental and safety hazards are being implemented. Erosion will also be monitored during the operations phase.

9.1.7 Waste Management

Monitoring during construction and operations (maintenance and repair works) is necessary to ensure environmental and community health and safety in respect of waste storage, handling and transportation related impacts.

9.1.8 Occupational Health and Safety

During construction and operations (maintenance and repair works), contractors will be monitored for compliance with health and safety plans and procedures.

9.1.9 Social Impact Monitoring

Community health and safety will be monitored throughout all the phases of the Project as part of the integrated ESHMP. This will involve monitoring progress with CDAP implementation, regularity of community consultations and awareness programmes, and the effectiveness of the grievance mechanism. Issues such as traffic accidents, influx, crime rates and STI rates will also be monitored for possible Project related increase.

9.2 Summary of Monitoring Costs

Costs related to environmental and social benefit enhancement and mitigation measures, etc. include costs for environmental and social management, monitoring, training and capacity building. Costs of certain items associated with environmental / social management and monitoring will be an integral part of specific items incorporated in overall Project budgets (e.g. construction Project costs and SRL's general operational costs), and no separate budget is necessary to cover these aspects.

Table 9.2-1: Costs for Management and Monitoring

Work/cost area	Construction Phase (USD)	Operations Phase (per annum) (USD)	Comments
Noise Monitoring	6,000	3,000	
Air Quality Monitoring	6,000	3,000	
Water Quantity	20,000	N/A	Potential cost for the provision of boreholes if community water levels are depleted as a result of project
Water Quantity Monitoring	6,000	N/A	
Water Quality Monitoring	6,000	N/A	
Monitoring of earthworks	6,000	N/A	
Waste Management Monitoring	6,000	2,000	
Occupational Health and Safety Monitoring	6,000	2,000	
Social Impact Monitoring	6,000	2,000	
TOTAL	**68,000**	**12,000**	

REFERENCES

Alie, Joe A.D. (2001), "Historical White Paper on Communities in Sierra Rutile Operational Areas in Southwestern Sierra Leone" (Knight Piesold, USA).

Alie, Joe A.D. (2012), "Cultural Heritage Survey of London Mining Operational Areas in Port Loko District" (Environmental Resources Management, UK).

Alie, Joe A.D. (2013). "Cultural Heritage Survey of London Mining Operational Areas in Tonkolili District" (Environmental Resources Management, UK).

Anderson, et al, (1976), A land use and land cover classification system for use with remote sensor data. U.S.Geological Survey Professional

Basu, Paul (2008). "Confronting the Past? Negotiating a Heritage of Conflict in Sierra Leone." *Journal of Material Culture*, Vol. 13 (2):233-347.

Bibby, C., Jones, M & Marsden, S. (2000). Expedition Field Techniques. Bird Surveys. Expedition Advisory Centre. Royal Geographic Society (with The Institute of British Geographers). London, UK.

Böhme, W, Schmitz, A. & T. Ziegler (2000). A review of the West African skink genus *Cophoscincopus* Mertens (Reptilia: Scincidae: Lygosominae): Resurrection of C. simulans (vaillant, 1884) and description of a new species. *Rev. Suisse Zool.*, **107** (4): 777-791

Böhme, W., H. Meinig & M.-O. Rödel (1996). New records of amphibians and reptiles from Burkina Faso and Mali. - *British Herpetological Society Bulletin, London*, No. **55**: 7-26.

Borrow, N. and Demey, R. (2008). Field Guide to the Birds of Western Africa. Christopher Helm. London.

Braima, S. J., Amara, P. S., Kargbo, B. B. and Moseray, B., 2006. Republic of Sierrra Leone 2004 Population and Housing Census. Analytical Report on Employment and Labour Force. UNFPA, SSL and EU. November 2006.

Briassoulis, H. (2000). Factors influencing Land Use and Land Cover Change Encyclopedia of Life Support System, EOLSS (Vol. 1, pp. 1-9).

Bury, R. B. (1983). Differences in amphibian populations in logged and old growth redwood forest. Northwest Science. 57:167-178.

Carr Jamie and Foden, Wendy, *Climate Change Unit IUCN Global Species Programme Cambridge, UK*

CEMMATS (2014) Environmental and Social Impact Assessment Study for Moyamba SMALL Hydroelectric Projectin Moyamba District. Executive Summary and Main Report. Volume 1. Freetown, Sierra Leone.

Clifford, Mary (1974). *The Land and People of Sierra Leone*. New York.

Duhamel C (2012). Land use, Land cover, including their classification. Encylopedia of life support system. Online. Accessed on 30/04/2017. Available from: http://www.eolss.net/sample-chapters/c19/E1-05-01-01.pdf

Eurostat (2001). *Manual of Concepts on Land Cover and Land Use Information Systems*; Office for Publications of the European Communities: Luxembourg, Available online:

FAO (1993b). FESLM: an international framework for evaluating sustainable land management, Smyth, A.J., & J. Dumanski, J. (eds.) (year). World Soil Resources Report 73, FAO, Rome. 74 p.

Feintrenie, L. (2014). Agro-industrial plantations in Central Africa, risks and opportunities. Online. Accessed on 12/05/14. From: http://link.springer.com/article/10.1007%2Fs10531-014-0687-5

Fermon, Y and C. Gsegner (2006). A guide of the Fresh Water Fish of the Bong County, St Paul and St John Rivers, Liberia.

Foley, J. A. Et al., (2005). Global Consequences of Land Use. S*cience* 22 July 2005: Vol. 309, Issue 5734, pp. 570-574 DOI: 10.1126/science.1111772

Gleave, M. B. (1996). The Length of the Fallow Period in Tropical Fallow Farming Systems: A Discussion with Evidence from Sierra Leone. *The Geographical Journal* Vol. 162, No. 1 pp. 14-24.

Government of Sierra Leone (2015). Draft National Land Policy of Sierra Leone version 6. Online. Accessed 05/08/2016. Available from:

Gunarso, P, E al, (2013). Oil palm and land use change in Indonesia, Malaysia and Papua New Guinea. file:///C:/Users/bocka/AppData/Local/Temp/4_oil_palm_and_land_use_change_Gunarso_et_al.pdf

Hillers, A. (2009): Herpetological survey in the Gola Forest, South-eastern Sierra Leone

Hillers, A., A. Barrie, J. Johnny & M.-O. Rödel (2007): Amphibian survey of mountainous areas of north-eastern Sierra Leone. Report for the Critical Ecosystem Partnership Fund/Conservation International.

Hoogmoed, M. S. (1974). Ghanese lizards of the genus Mabuya (Scincidae, Sauria, Reptilia). *Zool. Verhandelingen* **138**: 1-62.

http://ec.europa.eu/eurostat/ramon/statmanuals/files/KS-34-00-407-__-I-EN.pdf (accessed on 25/08/2016).

INTOSAI WGEA (2013). Land Use and Land Management Practices in Environmental Perspective. http://www.environmental-auditing.org/LinkClick.aspx?fileticket=NiwOS89K5Jk%3D&tabid=128&mid=568

IUCN (2012). IUCN Red List of Threatened Species. Gland, Switzerland.

IUCN (2017). IUCN Red List of Threatened Species. Gland, Switzerland.

Junjie W. (2008). Land Use Changes: Economic, Social and Environmental Impacts. Online. Accessed 08/08/2016. Available from:

Karl-Heinz ERB, Et Al., (2016). Land management: data availability and process understanding for global change studies. Global Change Biology (2017) 23, 512–533, doi: 10.1111/gcb.13443 http://onlinelibrary.wiley.com/doi/10.1111/gcb.13443/epdf?r3_referer=wol&tracking_action=preview_click&show_checkout=1&purchase_referrer=onlinelibrary.wiley.com&purchase_site_license=LICENSE_DENIED

Kingdon, J. (1997). The Kingdon field guide to African mammals. Academic Press, San Diego.

Larbi, A. (2012). Country Pasture/Forage Resource Profile http://www.fao.org/ag/agp/AGPC/doc/Counprof/Sierraleone/Sierraleone.htm

Laurance, W.F., Camargo, J.L.C., Luiza˜ o, R.C.C., Laurance, S.G., Pimm, S.L., Bruna, E.M., Stouffer, P.C., Bruce Williamson, G., Benı´tez-Malvido, J., Vasconcelos, H.L., et al. (2011). The fate of Amazonian forest fragments: a 32-year investigation. Biol. Conserv. 144, 56–67.

Laurance, W.F., Goosem, M., and Laurance, S.G.W. (2009). Impacts of roads and linear clearings on tropical forests. Trends Ecol. Evol. 24, 659–669.

Laurance, W.F., Laurance, S.G., Ferreira, L.V., Rankin-de Merona, J.M., Gascon, C., and Lovejoy, T.E. (1997). Biomass collapse in Amazonian forest fragments. Science 278, 1117–1118.

Lee, J.S.H., et al. (2013). Oil palm smallholder yields and incomes constrained by harvesting practices and type of smallholder management in Indonesia. Online. Accessed on 10/05/2017. From: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0159668

Little, Kenneth (1949). *The Mende of Sierra Leone*. London.

Little, Kenneth (1967). "The Role of Secret Society in Cultural Specialization." *American Anthropologist, Vol. 51, No. 2.*

Logistics Capacity Assessment (2016). Sierra Leone Road Assessment. [online] Available at http://dlca.logcluster.org/display/public/DLCA/2.3+Sierra+Leone+Road+Assessment;jsessionid=71E3E89E00BC0A8FD5505EB23AF79CB8 [Accessed 06/11/17]

Maconachie R, Hilson GM. 2011. Artisanal Gold Mining: A New Frontier in Post-Conflict Sierra Leone? Journal of Development Studies 47(4): 595–616.

Maitima, et al., (2009).The linkages between land use change, land degradation and biodiversity across East Africa. http://www.wec.ufl.edu/faculty/giulianob/private/wis3401/Maitima%20landuse%20change%20and%20biodoversity.pdf

Malupattu P. K. and Reddy, J.R.S. (2013). Analysis of Land Use/Land Cover Changes Using Remote Sensing Data and GIS at an Urban Area, Tirupati, India. Online. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3679719/

Martinez, S. and Mollicone, D. (2012). From Land Cover to Land Use: A Methodology to Assess Land Use from Remote Sensing Data. Online. Available from: http://www.mdpi.com/2072-4292/4/4/1024/pdf.

McCulloch, M (1950). *Peoples of Sierra Leone*, London: International African Institute.

McGarigal, K., Romme, W.H., Crist, M., and Roworth, E. (2001). Cumulative effects of roads and logging on landscape structure in the San Juan Mountains, Colorado (USA). Landscape Ecol. 16, 327–349.

Ndulue, et al. (2015). Assessment of land use/cover impacts on runoff and sediment yield using hydrologic models: A review. Online. Accessed on 30/04/2017. Available from: http://www.academicjournals.org/journal/JENE/article-full-text-pdf/31E49D450989

Okoni-Williams, A.D. (2013). Vegetation, carbon and nutrient cycling in the bush fallow system: the implications to the environment and local farming communities in Sierra Leone. PhD. Thesis submitted to the University of Sierra Leone. December 2013.

Okoni-Williams, A.D., Thompson, H.S., Koroma, A.P. and Wood P. (2005). Important Bird Areas in Sierra Leone: Priorities for biodiversity Conservation. Conservation Society of Sierra Leone and Forestry Division, GOSL.

Paper 964, U.S. Geological Survey, Reston, VA, USA

Paugy, D., Lévêque, C., & Teugels, G.G. (2004).The Fresh and Brackish Water Fishes of West Africa Vol.2. Publications scientifiques du Muséum, Paris, France.

Payne, A.I., Wakeford R. and E.T. Ndomahina (2006). Bumbuna Hydroelectric Project Baseline Biodiversity Surveys.Final Draft Baseline Fish Survey.Nippon Koel U.K.

Payne, A.I., Wakeford, R.C., &Ndomahina, T.E. (2010). Fish distribution and zonation along a tropical African river, the Rokel/Seli River, Sierra Leone, West Africa.*Smithinana Bulletin* 12: 25–38.

Pirker, J. et al (2016). What are the limits to oil pal expansion? Online. Available from: http://ac.els-cdn.com/S0959378016300814/1-s2.0-S0959378016300814-main.pdf?_tid=a8d33a14-3995-1

Ramjohn, K. (2008) Sustainable land use and impact assessment. Entropy and energy: toward a definition of physical sustainability (paper). Online. Accessed 04/08/2016. From: https://sustainablelanduse.wordpress.com/

Randolph, J. (2003). Environmental Land Use Planning and Management.

Reed, R.A., Johnson-Barnard, J., and Baker, W.L. (1996). Contribution of roads to forest

Renner-Thomas, A. (2010). Renner-Thomas, A. Land Tenure in Sierra Leone: The Law, Dualism and the Making of a Land Policy. Author House, London, United Kingdom

Rödel, M.-O. & Ernst, R. (2004): Measuring and monitoring amphibian diversity in tropical forests. I. An evaluation of methods with recommendations for standardization. Ecotropica 10: 1-14.

Rödel, M.-O. (2000). Herpetofauna of West Africa, Vol. I: Amphibians of the West African savanna. – Edition Chimaira, Frankfurt/M., 335 pp.

Rödel, M.-O., M. Gil, A.C. Agyei, A.D. Leaché, R.E. Diaz, M.K. Fujita & R. Ernst (2005). The amphibians of the forested parts of south-western Ghana. - *Salamandra*, Rheinbach **41**: 107-127.

Rödel, M.-O., M.A. Bangoura & W. Böhme (2004). The amphibians of southeastern Republic of Guinea (Amphibia: Gymnophiona, Anura). – *Herpetozoa*,

Sawyerr, Harry A.E. (1964). "Ancestor Worship – The Mechanics." *Sierra Leone Bulletin of Religion*, Vol. 6, No. 2.

Schiøtz, A. (1999). The Treefrogs of Africa. Chimaira, Frankfurt.

Trape, J-F. &Mane, Y (2006): Guide des serpents d'Afrique occidentale, savane et desert

Trombulak, S.C., and Frissell, C.A. (2000). Review of ecological effects of roads on terrestrial and aquatic communities. Conserv. Biol. 14, 18–30.

UNESCO (2007). *Cultural Heritage Protection Handbook 3: Documentation of Artefacts' Collections.* Paris: France.

UNESCO (2012). *Cultural Heritage Protection Handbook 6: Securing Heritage of Religious Interest.* Paris: France.

Valin et al., (2014). The future of food demand: understanding differences in global economic models. On line. Accessed 06/05/2017. Available from: http://onlinelibrary.wiley.com/wol1/doi/10.1111/agec.12089/full

Wakeford R and Payne A.I. (2007). A Photo Guide to the fish species of the Rokel/Seli River, Sierra Leone. MRAG London. 89pp.

Wheelhouse, Paul & Joe A.D. Alie (2012). "Baseline Cultural Heritage Environment Report" (New Liberty Gold Mine, Liberia).

Wien, **17** (3/4): 99-118.

Young, A. (1998). Land Resources; Now and For the Future. Cambridge University Press, 319p

Zug, G. (1987). Amphibians and Reptiles of the Outamba-Kilimi Region, Sierra Leone. *Journal of Herpetological Association of Africa.* **33**:1-4.

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