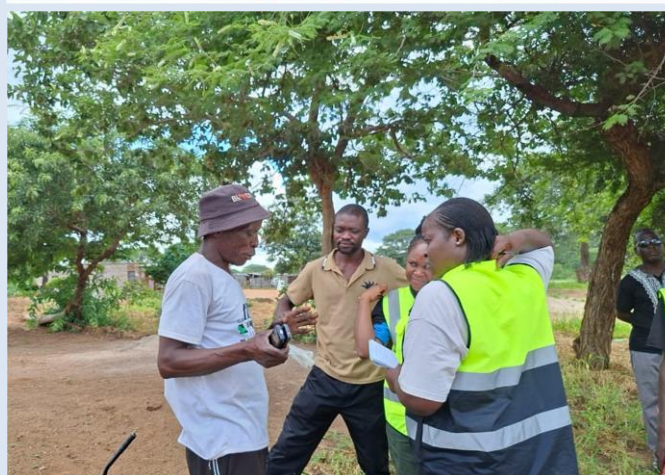


VICTORIA FALLS UNIVERSITY CLEAN ENERGY LIMITED

ENVIRONMENTAL AND SOCIAL IMPACT STATEMENT FOR THE PROPOSED CONSTRUCTION OF A 38MW SOLAR PLANT PROJECT

Kazungula District, Southern Province - Zambia



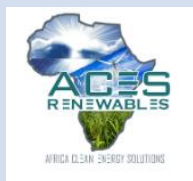
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Promoting **Environmental** Sustainability

18th June, 2026

Prepared For



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EXECUTIVE SUMMARY

Introduction

Victoria Falls University Clean Energy Limited (VFU-CEL) proposes to develop and operate a 38 MWp ground-mounted solar photovoltaic (PV) power plant with an anticipated export capacity of 25–28 MWac in Kazungula District, Southern Province, Zambia. The proposed project site is located at coordinates Latitude –17.761784 and Longitude 25.2729619, approximately 2 km from the Kazungula ZESCO Substation, which has been identified as the preferred point of interconnection to the national electricity grid. The project is intended to contribute to Zambia's efforts to diversify its electricity generation mix, reduce overreliance on hydropower, and enhance energy security through the development of clean, renewable energy resources.

VFU-CEL is a Zambian-registered special purpose vehicle formed through a partnership between ACES Renewables Limited, an experienced international renewable energy developer listed on the Stock Exchange of Mauritius, and Victoria Falls University of Technology, a private Zambian institution specialising in science, technology, and innovation. This partnership combines international technical and financial expertise with local institutional knowledge and capacity building. The project is aligned with national energy and climate policy objectives and is expected to deliver socio-economic benefits, including employment creation, skills development, and local infrastructure investment, while supplying low-carbon electricity to the national grid. The coordinates for the location of the proposed project are shown in the table below:

NO.	LATITUDE	LONGITUDE
1	17°45'09"S	25°16'45"E
2	17°45'18"S	25°16'57"E
3	17°45'49"S	25°16'34"E
4	17°45'43"S	25°16'26"E
5	17°45'36"S	25°16'24"E

Project Objective

The main objective of the proposed project is to develop, construct and operate a 38MWac grid-connected solar photovoltaic power plant in Kazungula District in order to supply clean and reliable electricity to Zambia's national grid. The project further aims to contribute to energy security, climate change mitigation, and sustainable economic development while ensuring that environmental and social impacts are effectively managed throughout the project lifecycle.

Major Project Components

The major component of the project is the construction of a utility-scale, grid-connected solar photovoltaic (PV) power plant with an installed capacity of approximately 38 MWac. It also encompasses all activities associated with renewable energy development, including installation of solar PV modules and electrical infrastructure, grid interconnection, and long-term operation and maintenance.

Shareholders

Name of shareholder	Nationality	Address	Percentage ratio
ACES Renewables LIMITED	UK	53 Harley Street, Flat 2, London, GBR, W1G 8QP	80%
Victoria Falls University of Technology	Zambian	Plot 2621 Nakatindi Road, M10, Livingstone, Zambia	20%

Regulatory framework and corporate requirements

A number of relevant local and international Acts and Regulations relating to environmental conservation and protection have been considered with respect to the proposed PV solar plant project. The legal framework and policy review conducted guided the assessment of the potential impacts of the project. Below is a list of some of the national statutes relevant to the project:

- a. Management Act No.12 of 2011 as amended by Environmental Management (Amendment) Act No. 8 of 2023;
- b. Statutory Number 3, of 2026 (The Environmental Management (Environmental Impact Assessment) Regulations, 2026
- c. Energy Regulation Act, No. 12 of 2019
- a. Electricity Act, No. 11 of 2019
- b. Urban and Regional Planning Act, No. 3 of 2015
- c. The Local Government Act, No 2 of 2019
- d. The Water Resources Management Act, No. 21 of 2011
- e. The Public Health Act, No. 19 of 2020
- f. The Public Roads Act CAP 12, 2002
- g. Occupational Health and Safety Act, No. 36 of 2010
- h. National Council for Construction Act, No. 13 of 2003
- i. The Land Act of 1995
- j. Water Supply and Sanitation Act, No. 28 of 1997
- k. National Heritage and Conservation Commission Act of 1989
- l. Roads and Traffic Act, No. 11 of 2002
- m. Employment of Young Persons and Children (Amendment) Act, 2004
- n. The Zambia Wildlife Act, No. 14 of 2015
- o. Workers Compensation Act, No. 10 of 1999.

International Policy Frame Work

Zambia is a signatory and party to so many international conventions and protocols. The following are some of the international conventions and/or protocols relating to the proposed project:

- p. United Nations Framework Convention on Climate Change
- q. Rio Declaration on Environment and Development.
- r. Basel Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992).
- s. Convention on International Trade in Endangered Species of Wild Fauna and Flora

Convention Concerning the Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution.

Analysis of Project Alternatives

Renewable energy technology alternatives

The proposed project considered different renewable energy producing processes including the Hydropower, wind power, solar power, and Biotechnology. Solar power alternative was evaluated and was selected because it offered the following advantages over Hydropower, wind power and Biotechnology:

- Zambia's solar power industry has proven exploitable potential, with high success rates due to reliable technology and successful SPPs
- Compared to hydropower, it is not dependent on water availability or rainfall patterns; unlike wind power, it is less affected by site-specific wind variability and mechanical wear from moving parts; and unlike

biotechnology (biomass energy), it does not rely on continuous feedstock supply or produce combustion-related emissions. This makes solar power a reliable, low-maintenance, and clean energy option.

- Economically, SPPs are a competitive renewable source of energy. SPPs can easily be rehabilitated or upgraded especially when the recent advances in Solar technologies are utilised.

Design Alternatives

Design alternatives considered were based on the two major existing technologies for solar energy: solar Photovoltaic (PV) and Concentrated Solar Power (CSP).

Concentrated Solar Power (CSP) systems use lenses, mirrors, and tracking devices to focus sunlight into a beam that is small. These systems have major drawbacks; they demand high direct normal solar radiation, they are highly maintenance-intensive and require large land areas that have limited cloud cover, requiring 5-10 acres per MW of power.

Solar photovoltaic (PV) systems, on the other hand, use the photovoltaic effect to convert sunlight into electricity using silicon panels. These systems are highly reliable, demand for relatively less land size, require little maintenance, and have relatively low operation costs. With attractive project finance, adequate transmission infrastructure, and a simple design that saves operating and maintenance costs, PV technology is suited for power plants up to 100 MW and this is what is obtaining in the project area.

Therefore, the developer chose the solar photovoltaic (PV) SPP system for the proposed project. Solar panels made out of silicone-containing solar cells will be utilized to generate photovoltaic (PV) power.

Alternative Source of Energy

Option A: Implement Project Using Hydropower

Use of hydropower is a main energy source in the country. However, the use of hydropower has its own challenges. Particularly high initial costs of installation, site specificity and climate dependency.

Option B: Implement Project Using Solar energy

Option B was selected as a more suitable source of energy for various reasons. Unlike hydropower, it is less dependent on water availability, making it more reliable during droughts or low rainfall periods. It promotes energy independence, and generally has lower operation and maintenance costs compared to hydropower facilities.

Environmental Baseline Study

The following paragraphs briefly describe the current baseline of each aspect considered in the ESIA as well as the main impacts of the Project on these elements of the physical, natural and socio-economic environment.

Kazungula District lies within the semi-tropical **climatic** zone and experiences a well-defined seasonal pattern marked by three distinct seasons. The cool and dry season occurs from April to August and is characterized by lower temperatures, reduced humidity, and minimal rainfall.

Average monthly **temperature** in the project area ranges from as low as 17.75–17.8 °C in June and July to a peak of approximately 27.78 °C in October, reflecting cooler conditions during the mid-year dry season and progressively warmer conditions towards the end of the dry season.

The proposed project site is located within the Zambebian and Mopane woodlands biome, predominantly characterised by Mopane and Mungongo tree species. The surrounding **vegetation** is largely composed of secondary growth shrubs, reflecting extensive historical and ongoing timber harvesting and charcoal production. The project area, including the adjacent Protected Forest, has experienced a high level of human influence estimated at approximately 85%, with only a small portion of the project area remaining near intact vegetation.

The project area falls within a site with a richness of **mammals** such as *Cercopithecus aethiops* (Vervet monkey) to mention but a few. In addition, the project area falls within an elephant corridor.

Environmental Impacts

There are currently limited sources of air and noise pollution within the immediate Project Area. However, background noise and air emissions are present due to vehicular traffic from the nearby main road. During the construction phase, air emissions (mainly dust and exhaust fumes) and noise levels are expected to increase temporarily due to construction activities and equipment operation. These impacts will be localized to the construction sites and confined to the construction period. The Project will not have a major influence on the geology of the area.

The Project Area is currently partially disturbed due to previous tree clearing activities, with patches of remaining natural vegetation. The proposed development will result in a formal change in land use to a solar photovoltaic power generation facility.

Implementation of the Project will require site clearing, which will lead to further loss of vegetation within the development footprint. Although this represents a negative impact, the affected vegetation is common and widely distributed within the region. Therefore, the Project is not expected to result in the loss of plant species of conservation concern or the destruction of unique or sensitive habitats.

During the construction phase, the Project will lead to the **influx** of a sizable work force, with potential direct and indirect job opportunities.

Mitigation Measures

Two types of mitigation measures are identified in this Environmental and Social Impact Statement (ESIS) Report in order to alleviate or manage the potential impacts identified:

- a. Measures to be taken to manage potential impacts considered to be of medium or high significance. Following application of these measures, residual impacts are expected to be lower.
- b. Recommended measures that could be taken to manage impacts classified as low/insignificant. These measures can be considered as good management practices.

Impacts and Mitigation/Enhancement Measures

As with most infrastructure and energy development projects, the implementation of this solar photovoltaic power generation facility will result in a number of impacts, which may be either positive or negative, and either direct or indirect. The anticipated impacts associated with the Project are outlined below:

Impact	Mitigation/Enhancement Measures
	Positive Impacts
Impact	Enhancement Measures
Increased employment opportunities for locals	• Priority will be given to the local people. • Only skills that are not available within the local community will be sourced from other areas. • Skills base for the area will be increased by training the locals, especially those skills that can be mastered within a short time. • Women and the vulnerable groups, like widows to be given preference; • Ensure expectations are well managed and avoid strikes; and • Manage community relations well.
Improvement of the local economy	• Encourage construction workers to buy from the local communities • Procure all materials from the district if possible • The developer will support the improvement of market facilities in the area

Increased opportunities for skills transfer	- Ensuring there is a skill transfer programme. - Categorize staff into defined groups, with each group supervised by dedicated and suitably skilled personnel to facilitate effective supervision and structured on-the-job training. - Encourage on-the-job training through observation and trial under supervision.
Increased revenue base for the government	VFU-CEL will adhere to all the tax requirements of the Government of the Republic of Zambia.
Negative Impacts	
Impact	Mitigation Measures
Air Pollution	- Water bowsters will be employed on site to suppress dust on all site roads. - Designated routes will be established on site for motor traffic. - Site workers will be issued with personal protective attire. - All the sand or soil heaps will be removed as soon as possible to avoid nuisance dust arising from prevailing wind. - All equipment and machinery will be regularly serviced
Noise Pollution	- All mobile vehicles and equipment will have noise reducers - All land preparation activities will take place during the day and any work during night-time will be communicated to the state authorities and local community
Surface and ground Water Pollution	- Refuel and maintain machinery in designated areas with containment. - Store chemicals and materials in sealed containers away from drains. - Clean up spills immediately. - Use oil traps in drainage where needed.
Soil Contamination	Regular servicing and maintenance of equipment and vehicles.
Soil erosion	- Only clear areas needed for foundations, access roads, and equipment. - Keep existing vegetation around the site as much as possible to stabilize soil. - Design temporary drainage channels to direct stormwater safely without causing erosion. - Re-vegetate exposed soil areas after construction using grass or groundcover plants.
Occupational and Public health safety risks	- Continue ensuring that labour and working conditions of contractors, subcontractors and VFU-CEL itself as well as the supply chain are within the requirements of the labour laws of Zambia and International Standards. - Continue implementing the established worker grievance system - Ensure compliance to Occupational Safety and Health standards throughout the project - All site workers will undergo Safety, Health, Environment and Quality assurance inductions before starting work and after leave break - All contractors to provide their own trained SHE Officers on site - Personal protective clothing to be supplied per worker
Hazardous waste generation	- Reduce the quantity of hazardous materials used on-site wherever possible. - Separate hazardous waste (oils, batteries, chemicals) from general waste. - Store hazardous waste in labeled, sealed containers in a secure area. - Dispose of hazardous waste through approved waste management companies in line with local regulations.
Landuse conflicts	- VFU-CEL will put up an effective grievance management mechanism. - VFU-CEL will ensure that all activities are confined to the project area. - No settlements are within proposed area for the farm hence resettlements issues will not arise

Increased cases of HIV/AIDS sexually transmitted infections	- Implementing an extensive HIV/AIDS and STI education campaign among the local population, targeting not only youth but adults as well. Such a campaign shall be initiated immediately as soon as construction starts. - Implementing a comprehensive and on-going HIV/AIDS and STI education campaign targeting all workers hired for the project, both local and international.
Climate Change	- Planting of trees which will replace the cleared forest and the trees will continue redressing the effects of climate change. - Employ fuel-efficient or electric machinery during construction and maintenance. - Source materials locally where possible to reduce transport-related emissions. - Use energy-efficient lighting and equipment at the facility.

None of the negative environmental or social impacts identified relating to the VFU-CEL project can be considered critical, irreversible or unprecedented. In general, the overall environmental and social risks were found to be manageable and of low significance.

Project Implementation Date and Cost of the Project

The project is scheduled to be implemented immediately the necessary approvals are received from ZEMA. The total cost of the project is USD 22 267 287.

Conclusion

The Environmental and Social Impact Assessment (ESIA) study objectively assessed and evaluated impacts that may arise due to the proposed Solar PV project. The drafting of this ESIS was based on the design information on the project, which was provided by the design team who worked in conjunction with the ESIA team. The Mitigation measures and the Environmental Management and Monitoring Plan were formulated based on the level of detail and depth of the available information. In-depth analysis of the impacts revealed the following key findings:

Environmental Impacts

- Land Use Change: Conversion of partially disturbed land to solar PV facility.
- Vegetation Loss: Clearing of vegetation within the project footprint; low ecological significance if species are common.
- Soil Erosion: Exposed soil during construction may be susceptible to erosion, mitigated with sediment control.
- Surface and Groundwater Pollution: Minor risk from machinery fuels, lubricants, and maintenance chemicals.
- Hazardous Waste Generation: Limited amounts from used oils, batteries, and damaged panels.
- Noise and Air Quality: Temporary increase during construction due to machinery and transport; minimal during operation.
- Climate Change Benefits: Reduction in greenhouse gas emissions through renewable energy generation.

Socio-Economic Impacts

- Employment Opportunities: Short-term construction jobs and limited long-term operation jobs.
- Energy Supply: Contribution to reliable and clean electricity to the national grid.
- Traffic and Safety: Increased vehicle movement during construction; minimal during operation.

Positive Impacts

- Sustainable Development: Supports national renewable energy targets.
- Environmental Benefits: Reduced reliance on fossil fuels, lowering carbon emissions.

Residual Impacts

- After applying mitigation measures (e.g., erosion control, spill management, proper waste disposal), most negative impacts are low to moderate in significance and temporary.

General Recommendations

Occupational safety and Health: Ensure that workers' occupational health and safety standards are maintained through capacity building, proper training, providing protection, clothing, and managing their camps to the required health standards.

Environmental audits and monitoring: Regular environmental audits should be carried out on the project in order to ensure compliance of the project with the mitigation measures outlined in the Environmental and Social Management Plan (ESMP).

Waste Management: Proper segregation, storage, and disposal of hazardous and non-hazardous waste, including damaged solar panels, batteries, oils, and chemicals. Recycling should be prioritized where possible.

Traffic and Access Management: Control construction vehicle movement to reduce congestion, accidents, and land damage. Clearly mark access routes.

Community Health and Safety: Prevent unauthorized access to the site and maintain open communication with nearby communities regarding construction schedules, hazards, and safety measures.

Biodiversity and Vegetation Management: Protect remaining natural vegetation and wildlife habitats. Rehabilitate cleared areas after construction through replanting or groundcover.

Water Management: Implement stormwater and erosion control measures to prevent runoff and contamination of nearby rivers, streams, or wetlands.

Noise and Air Quality Management: Limit construction noise and dust through scheduling, dust suppression, and proper machinery maintenance.

Emergency Preparedness and Response: Develop and maintain emergency plans for accidents, fires, chemical spills, or extreme weather events.

Training and Capacity Building: Provide regular environmental awareness and safety training for all workers, including site induction for new staff.

Decommissioning and Site Rehabilitation: Plan for the removal of project structures and restoration of the site at the end of the facility's operational life.

Dimakatso Machetele
Project Developer

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LIST OF ACRONYMS

ACRONYM	DEFINITION
AfDB	Africa Development Bank
CBD	Convention on Biodiversity
CSO	Central Statistics Office
CSPs	Country Strategy Papers
ESIS	Environmental and Social Impact Statement
ESIA	Environmental and Social Impact Assessment
EMA	Environmental Management Act
EPPCA	Environmental Protection and Pollution Control Act
ESMP	Environmental and Social Management Plan
EMSMP	Environmental Management and Social Monitoring Plan
GHGs	Green House Gases
GIDD	Gender In Development Division
GMOs	Genetically Modified Organisms
GPS	Global Positioning System
GRZ	Government Republic of Zambia
IESIA	Integrated Environmental and Social Impact Assessment
IFC	International Finance Corporation
ILO	International Labour Organisation
ITCZ	Inter-tropical Convergence Zone
IUCN	International Union for the Conservation of Nature
ISS	Integrated Safeguards System
LC	Least Concern
MLNREP	Ministry of Lands Natural Resources and Environmental Protection
NEAP	National Environmental Action Plan
NCS	National Conservation Strategy
NPE	National Policy on Environment
NUWSSP	National Urban Water Supply and Sanitation Programme
NGOs	Non-Governmental Organisation
NHCC	National Heritage Conservation Commission
OS	Operation Standards
PV	Photovoltaic
PMC	Project Management Consultant
RMC	Regional Member Country
RTSA	Road Traffic and Safety Agency
UNFCCC	United Nations Convention on Climate Change
UNICEF	United Nations International Children's Emergency Funds
VFU-CEL	Victoria Falls University Clean Energy Limited
WARMA	Water Resources Management Authority
WDCs	Ward Development Committees
WID	Women In Development
ZEMA	Zambia Environmental Management Agency

1 INTRODUCTION

Victoria Falls University Clean Energy Limited (VFU-CEL), is a Zambian-registered special-purpose company, proposes to develop, construct, and operate a 38 MWac ground-mounted solar photovoltaic (PV) power plant in Kazungula District, Southern Province, Zambia. The project site is at the central coordinates Latitude -17.761784 and Longitude 25.2729619 , approximately 2 km from the Kazungula ZESCO Substation, identified as the preferred grid interconnection point. VFU-CEL is jointly owned by ACES Renewables Limited, an experienced international renewable energy developer listed on the Stock Exchange of Mauritius, and Victoria Falls University of Technology, a private Zambian institution focused on science, technology, and innovation. The project is intended to support Zambia's national energy policy objectives, particularly diversification of the energy mix, reduced reliance on hydropower, and increased private-sector participation in electricity generation.

The proposed Kazungula Solar PV Project will have an installed alternating current (AC) export capacity of approximately 38 MW. The development will occupy about 50 hectares of land secured under a long-term notarial lease and will include solar PV arrays, inverters, transformers, a PV switch station, internal access roads, perimeter fencing, a small operations and maintenance office, and a temporary construction laydown area. The solar PV facility is expected to generate an average of approximately 58.8 GWh of electricity per annum, based on an estimated daily average of 4.6 operating hours. Electricity produced by the plant will be evacuated through a proposed 66 kV overhead transmission line of approximately 1.5 km in length, connecting the project site to the nearby ZESCO network. Three potential grid interconnection options are currently under technical evaluation: (i) a direct connection at the Kazungula 66 kV busbar located at coordinates $17^{\circ}46'09.07''\text{S}$, $25^{\circ}17'01.19''\text{E}$, (ii) a link-in-link-out (LILo) arrangement on the Kazungula–Mwandi 66 kV line, and (iii) a link-in-link-out (LILo) arrangement on the Kazungula–Nakabala 66 kV line. While detailed technical data is held by ZESCO, a visual site inspection confirmed the presence of a 66/11 kV, 5 MVA transformer at the substation, together with associated switchgear, circuit breakers, isolators, and busbars, as well as three existing 66 kV feeders. The final configuration, routing, and technical specifications of the grid connection will be determined based on the outcomes of ongoing grid impact assessments and detailed connection studies to ensure system reliability, safety, and compliance with ZESCO grid requirements.

At this stage, the project remains at concept design level, and detailed engineering specifications can only be provided by the appointed Engineering, Procurement and Construction (EPC) contractor during the detailed design and construction phase. Current concept design configuration options include: (a) a 25 MWac single-axis tracker solar PV plant occupying approximately 50 hectares, (b) a 25 MWac fixed-tilt solar PV plant occupying approximately 38 hectares, and (c) a 31 MWac fixed-tilt solar PV plant occupying approximately 50 hectares. Inverter specifications and detailed plant equipment, including collector substations and associated balance-of-plant infrastructure, cannot be definitively confirmed at this stage, as ongoing technical and grid studies have not yet been completed. The information presented herein is therefore at a high-level conceptual stage, and further technical clarification will be provided once detailed engineering studies are finalised; in the interim, engagement with the project technical team can be arranged to provide additional guidance as required.

To ensure that the proposed development is implemented in an environmentally and socially responsible manner, VFU-CEL is undertaking this Environmental and Social Impact Assessment (ESIA) in accordance with the Environmental Management Act No. 12 of 2011, as amended by Act No. 8 of 2023, the Environmental Impact Assessment Regulations, Statutory Instrument No. 3 of 2023 and the Environmental Impact Assessment (EIA) Regulations no. 3 of 2026. The ESIA process is also aligned with the Green Economy and Climate Change Act No. 18 of 2024, which promotes low-carbon and climate-resilient development. While this report is referred to as an ESIS to reflect its integrated environmental and social scope, it fulfils all statutory requirements of an Environmental Impact Assessment (ESIA) under Zambian law and provides the basis for identifying, assessing, and managing potential impacts associated with the proposed Kazungula Solar PV Project. The ESIS provides information about the proposed project and its development, the legal framework relevant to the project, and a

summary of the baseline studies that have been conducted. The report also provides an assessment of impacts on the natural and social environment, and presents recommendations to mitigate these effects as part of an Environmental and Social Management Plan (ESMP)

1.1 Project Background

Victoria Falls University Clean Energy Limited (VFU-CEL) was established as a special-purpose company to develop, construct, and operate renewable energy projects in Zambia. The company is jointly owned by ACES Renewables Limited, an international clean energy developer with a strong track record in Africa, and Victoria Falls University of Technology, a private Zambian university with a strategic focus on science, technology, and innovation.

The proposed Kazungula Solar PV Project forms part of ACES Renewables' broader African renewable energy portfolio, which includes utility-scale solar projects in Kenya, Uganda, Namibia, South Africa, and other selected African countries. In Zambia, the project is intended to support national development objectives by increasing private sector participation in power generation, enhancing energy security, and contributing to climate change mitigation through low-carbon electricity generation.

The project has progressed through pre-feasibility stages, with land secured through a long-term notarial lease, and key studies initiated, including feasibility studies, grid impact studies, geotechnical and geohydrological investigations, and permitting processes with Zambia Environmental Management Agency (ZEMA), Energy Regulation Board (ERB), Water Resources Management Authority (WARMA), and Zambia Electricity Supply Corporation (ZESCO).

1.2 Summary description of the project including project rationale

The proposed project involves the construction and operation of a 38 MW ground-mounted solar photovoltaic (PV) power plant in Kazungula District, Southern Province, Zambia. The facility will comprise solar PV arrays, inverters, mounting structures, associated civil and electrical infrastructure, and auxiliary facilities within an approximately 50-hectare secured site. Power generated will be evacuated to the national grid via the Kazungula ZESCO Substation. The rationale for the project is to support Zambia's energy diversification and climate change mitigation objectives by reducing reliance on hydropower and providing other clean, reliable, and low-carbon electricity, while also delivering socio-economic benefits through employment creation, skills transfer, and stimulation of local economic activity, with land clearing confined strictly to the project footprint and managed to minimise environmental and social impacts.

1.3 Project Objective

The main objective of the proposed project is to develop, construct, and operate a 38 MWac grid-connected solar photovoltaic power plant in Kazungula District in order to supply clean and reliable electricity to Zambia's national grid. The project further aims to contribute to energy security, climate change mitigation, and sustainable economic development while ensuring that environmental and social impacts are effectively managed throughout the project lifecycle.

1.4 Contact Details of Developer

Table 1-1: Contact details of developer

Item	Details
Developer	Victoria Falls University Clean Energy Limited (VFU-CEL)
Contact Person	Dimakatso Machetele
Designation	Project Developer
Physical Address	33 Fricker Road, Illovo, Sandton, 2196 South Africa
Mobile	+27 83 708 8734/0977892460
Email	dimakatso@acesrenewables.com

1.5 Details of Shareholders

Table 1-2: Details of Shareholders

Name of shareholder	Nationality	Address	Percentage ratio
ACES Renewables LIMITED	UK	53 Harley Street, Flat 2, London, GBR, W1G 8QP	80%
Victoria Falls University of Technology	Zambian	Plot 2621 Nakatindi Road, M10, Livingstone, Zambia	20%

1.6 Company Description

Victoria Falls University Clean Energy Limited (VFU-CEL) is a Zambian-registered special purpose company established to develop, construct, own, and operate renewable energy projects in Zambia. The company was formed as a result of a strategic partnership involving ACES Renewables Limited, an experienced international renewable energy developer with a strong portfolio of utility-scale projects across Africa and listed on the Stock Exchange of Mauritius, and Victoria Falls University of Technology, a private Zambian university focused on science, technology, and innovation. VFU-CEL combines international technical and financial expertise with local institutional knowledge to deliver sustainable, compliant, and commercially viable clean energy projects that support Zambia's national energy, climate, and development objectives.

1.7 Cost of the Project

The total project cost of the proposed Kazungula Solar Photovoltaic (PV) Project is USD 22 267 287.

2 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

2.1 National Institutional Framework

2.1.1 Ministry of Energy

The Ministry of Energy is responsible for the development and management of energy resources in a sustainable manner for the benefit of the people. The mandate and portfolio functions of MoE as outlined in the government Gazette Notice No.836 of 2016 are as follows:

Development of Renewable Energy Sources;

- Electricity;
- Energy Policy;
- Nuclear Energy Policy;
- Oil Pipeline and Refineries;
- Petroleum; and
- Petroleum Storage and Pricing.

In executing its mandate, the Ministry supervises the following statutory bodies and parastatals: Energy Regulation Board (ERB); Rural Electrification Authority (REA); Zambezi River Authority (ZRA); INDENI Oil Refinery; TAZAMA Pipelines Limited and ZESCO Limited.

The Ministry has five departments and the two that have a bearing on the project include: Department of Energy and Department of Petroleum.

2.1.2 Ministry of Local Government and Rural Development

The Ministry of Local Government and Rural Development (MLGRD) is charged with the responsibility of promoting a decentralized and good local governance system, facilitating delivery of quality municipal services in order to contribute to sustainable socio-economic development. The Ministry oversees the implementation of delegated functions and responsibilities by the local authorities. The Ministry supervises all councils in the country. It has ten departments, but the three key ones include: Departments of Local Government Administration, Physical Planning, and Rural Development.

2.1.3 Other Line Ministries

Environmental and social issues cut across a wide variety of sectors and there are a number of government institutions and agencies which are involved in environmental and social management. Some of the ministries, sectoral agencies and authorities that may be involved in the project include:

- Ministry of Green Economy
- Ministry of Education
- Ministry of Health
- Ministry of Lands
- Ministry of Tourism
- Gender Division

2.1.4 Zambia Environmental Management Agency

The Zambia Environmental Management Agency (ZEMA), previously known the Environmental Council of Zambia (ECZ) is the umbrella environmental institution in Zambia and the main lead agency on matters pertaining to Environmental and Social Impact Assessment (ESIA). It is empowered by the Environmental Management Act (No. 12 of 2011) (EMA) to identify projects, plans and policies for which an ESIA is necessary. The general functions of the ZEMA are to ensure the sustainable management of natural

resources, the protection of the environment, and the control of pollution, as provided under Article 9(1) of the EMA. However, more specifically, the ZEMA serves inter alia to:

- Co-ordinate the implementation of activities of all government ministries, appropriate authorities and conservancy authorities in matters relating to the environment.
- Develop standards and guidelines relating to the protection of air, water, land and other natural resources;
- Provide for environmental monitoring and auditing as well as establishing and managing of the environmental fund;
- Develop and enforce measures aimed at preventing and controlling pollution;
- Advise the government on the formulation of policies on all aspects of the environment and make recommendations for the sustainable management of the environment;
- Advise on all matters relating to environmental conservation, protection and pollution control, including necessary policies, research investigations and training;
- Initiate, conduct and promote research, surveys, studies, training and investigations in environmental management;
- Identify projects, plans and policies that need environmental impact assessments;
- Monitor trends of natural resources, their use and impact on the environment and make necessary recommendations to the appropriate authority;
- Undertake general education programmes for the purpose of creating public awareness on the environment;
- Provide for public consultation in environmental decision – making and access to environmental information;
- Request information on proposed projects and advise stakeholders on projects, programmes, plans and policies for which environmental assessment is necessary; and
- Facilitate the implementation of international environmental agreements and conventions to which Zambia is a party.

The services provided by the ZEMA specifically in relation to ESIA studies include:

- Assisting the developer to determine the scope of ESIA studies;
- Reviewing project briefs, terms of reference, and environmental and social impact statements (ESIS) and decision-making;
- Disclosure of the ESIS to the public through the media;
- Holding public hearing meetings to discuss the ESIS with stakeholders;
- Conducting verification surveys of the affected environment;
- Monitoring the project once implemented;
- Conducting compliance audits of the project between 12 and 36 months after implementation; and
- General administration of all the Regulations under the EMA. The ZEMA has a number of units which control various aspects of environmental pollution planning and environmental management. These have been organised under two departments:
 - The Pollution Control Inspectorate is responsible for all pollution and regulation issues pertaining to waste, emissions and toxic substances. This inspectorate also has a dedicated unit responsible for ESIA's.
 - The Planning and Information Management Department, which comprises units in charge of planning, monitoring, education, communication, information, documentation and data management.

The proposed project will be required to be cleared by the Agency to determine the level of environmental assessment to be conducted and submitted to ZEMA for approval before project implementation.

2.1.5 Water Resources Management Authority (WARMA)

The Water Resources Management Authority (WARMA) is a statutory body established under the Water Resources Management (WRM) Act No. 21 of 2011. The WRM Act mandates WARMA to regulate, manage, develop, protect, and conserve water resources in Zambia for all users. Established as a semi-autonomous government institution under the Ministry of Water Development & Sanitation, WARMA has been in existence as a key government entity since its operationalization in 2014.

The main purpose of the Authority is to serve as the regulatory body for the management and development of water resources across the country. At its apex is a Board of Directors who provide oversight and policy guidance to the Authority.

The Authority has its Headquarters in Lusaka and operates in four (4) Catchment offices namely, Kafue, Luangwa, Chambeshi and Zambezi catchment offices. Luapula and Tanganyika Catchments do not have offices yet but are managed by the Chambeshi Catchment office. The Authority is responsible for promoting a gender-sensitive, integrated, interactive, participatory, and multisectoral approach to water resources management and development that includes human, land, environmental and socioeconomic considerations, especially poverty reduction and the elimination of water borne diseases.

The core functions of the Authority as contained in the Water Resources Management Act No. 21 of 2011 include:

- Identify and protect potential sources of freshwater supply;
- Conserve, preserve and protect the environment, in particular, wetlands, quarries, dambos, marshlands and headwaters and take into account climate change and the challenges posed by climate change
- Plan for and ensure the sustainable and rational utilization, management and development of water resources based on community and public needs and priorities, within the framework of national economic developmental policies;
- Set standards and guidelines, with relevant appropriate authorities, to be used in undertaking water resources management and developmental activities in a catchment; and
- Publish forecasts, projections and information on water resources.

WARMA together with ERB is part of the ZEMA board that validates and approves EPBs and ESISs.

2.1.6 Energy Regulation Board (ERB)

The Energy Regulation Board (ERB) has the mandate of regulating the energy sector in line with the provisions of the Energy Regulation Act of 2003. The ERB has the responsibility of ensuring that power generating utilities earn a reasonable rate of return on their investments that is necessary to provide a quality service at affordable prices to the consumer.

In order to carry out this role, the ERB, among other functions, ensures that all energy utilities in the sector are licensed, monitors levels and structures of competition, and investigates and remedies consumer complaints.

Given that the solar power plant project will feed power in the national grid, licenses may be required from ERB. Hence, the developer will need to keep ERB informed about the project. ERB will also be involved in the importation of solar panels.

2.1.7 City, Municipal and Town Councils

The law relating to Local Authorities in Zambia is contained in the Republican Constitution Article 109(1). The detailed law on Local Government is contained in the Local Government Act of the Laws of Zambia. It provides for the establishment of Councils, their constitution, proceedings, Committees, Finance, functions, manner of regulation and by-laws, and appointment of Local Government Administrators. Under the Act, the Minister of Local Government may establish a City, Municipal, District, Township Council, or Management Board. Councils are established under the Local Government Act. The functions of the Councils include town planning, land allocation on behalf of the Ministry of Lands and pollution control.

The Town Council that will be involved in this project is Kazungula Town Council. The council will be key in the acquisition of land for the project. The proposed project will seek approval from the local authority for the infrastructure.

2.1.8 Traditional Authorities

There is a dual system of governance in Zambia, the political structures of governance and the traditional leadership structures. The systems of authority are recognized as complementary structures which have differing responsibilities.

Rural communities of Zambia are led by Chiefs, who are the custodians of local tradition, morals, and the traditional practices of the various national ethnic groups. At a national level, Chiefs are represented in the House of Chiefs, an advisory body to the Government with regards to issues relating to the welfare of their respective tribes. The Traditional Authorities are the custodian of customary land and have powers to allocate up to 250 hectares of land to individuals or organizations. The proposed project will be located on state land. Therefore, there will be no need to seek consent of the Chief in as far as land acquisition is concerned.

2.2 National Safeguard Policies, Strategies and Legislation

2.2.1 National Safeguard Policies and Strategies

2.2.1.1 Zambia Vision 2030

Vision 2030 expresses Zambia's aspirations in growing the economy, good governance and most importantly developing its people. One key basic principle of Vision 2030 is sustainable development. The vision sets key goals (which are relevant to the Project) that by the year 2030:

- Zambia's rural and urban population has universal access to clean, reliable and affordable energy by the use of alternative, renewable energy sources such as hydropower. The goal is to reduce the heavy reliance on wood fuel, decrease the rate of deforestation and increase the probability for rehabilitation of forest reserves with an overall reduction in the "cost to the Zambian environment".
- There is an upgrade of existing and construction of new infrastructure by developing and implementing private- public partnerships with both local and international industries. By achieving this goal, connectivity is increased and thus an increase in the GDP contribution.
- Zambia's biodiversity is protected in numerous national parks and local forest reserves. By developing, rehabilitating and maintaining these tourist-related infrastructures, Zambia can protect its natural reserves in a sustainable manner that is mutually beneficial to the biodiversity as well as the Zambian economy through tourism.
- There are maintenance of a productive environment and well conserved natural resources to facilitate sustainable socio-economic development.

- There is effective utilisation of freshwater resources for a variety of purposes whilst maintaining the quality of the source.
- National Policy on Environment

The National Policy on Environment (NPE) is the main policy that directs environmental management in Zambia. The policy is designed to create a complete framework for effective natural resource utilization and environmental conservation which will be sensitive to the demands of sustainable development. The specific objectives of the NPE are to:

- Promote the sound protection and management of Zambia's environment and natural resources in their entirety, balancing the needs for social and economic development and environmental integrity to the maximum extent possible, while keeping adverse activities to the minimum;
- Manage the environment by linking together the activities, interests and perspectives of all groups, including the people, nongovernmental organizations (NGOs) and government at both the central and decentralized local levels;
- Accelerate environmentally and economically sustainable growth in order to improve the health, sustainable livelihoods, income and living conditions of the poor majority with greater equity and self-reliance;
- Ensure widely based environmental awareness and commitment to enforce environmental laws and to the promotion of environmental accountability;
- Build individual and institutional capacity to sustain the environment;
- Regulate and enforce environmental laws; and promote the development of sustainable industrial and commercial processes having full regard for environmental integrity.

The policy strengthens the strategy to capacitate Ministry of Local Government and Rural Development, Department of Housing and Infrastructure Development (DHID), and local authorities with adequate resources to rehabilitate and extend water supply and sewerage systems and other forms of sanitation and develop and manage solid waste systems.

2.2.1.2 National Water Policy

The National Water Policy (2020) is the overarching framework guiding the management, development, and protection of water resources in Zambia. Although the proposed 38 MW solar power plant is not a water supply or sanitation (WSS) project, the policy is relevant and applicable where project activities may affect water resources.

During the construction and operation phases, the solar plant may require water abstraction for construction activities, including dust suppression, concrete works, equipment cleaning, and limited domestic use by workers. In addition, land clearing, earthworks, and the establishment of access roads may pose risks of surface runoff, erosion, sedimentation, and potential contamination of nearby water bodies, wetlands, or flood plains if not properly managed. In this regard, the project is expected to align with the National Water Policy principles by:

- Promoting the sustainable and efficient use of water resources and avoiding wastage;
- Ensuring the protection of ecologically sensitive areas, including wetlands and flood plains, where applicable;
- Implementing appropriate erosion control and water pollution prevention measures;
- Complying with water abstraction and discharge permitting requirements under relevant water management legislation;
- Encouraging community and stakeholder participation, particularly where local water resources may be affected.

Therefore, while the National Water Policy does not directly regulate energy generation projects, it provides important guidance for safeguarding water resources associated with the planning, construction, and operation of the proposed solar power plant, and should be considered in the project's environmental and social management measures.

2.2.1.3 National Conservation Strategy

The National Conservation Strategy (NCS) formulated in 1985 has been the main policy document on the Environment and Natural Resources in Zambia. The NCS was prepared by the Government to manage natural resources and the environment in the context of a centrally planned and controlled economy. The Strategy's main goal is to: "satisfy the basic needs of all the people of Zambia, both present and the future generations, through the wise management of natural resources". The strategy establishes policies and devises plans and to fully integrate conservation into Zambia's social and economic development. It also aims to analyse trends and current issues to better anticipate problems and needs. The main objectives of the NCS are to:

Ensure the sustainable use of Zambia's renewable natural resources such as forests;

- Maintain Zambia's biological diversity; and
- Maintain essential ecological processes and life support systems in Zambia.

2.2.1.4 National Environmental Action Plan

The focus of the National Environmental Action Plan (NEAP) of 1994 is to identify environmental problems and issues, analyse their causes, and recommend necessary interventions. The NEAP was prepared as a comprehensive plan to hold the ever-increasing environmental degradation in Zambia. The preparation of NEAP was because of Government's desire to update the NCS for the following reasons:

- the economy was undergoing a period of liberalization,
- the main NCS recommendations had been implemented,
- the technical information in the NCS needed updating, and
- there was a requirement by World Bank for a NEAP as a prerequisite for International Development Association (IDA) loan funding.

The NEAP is founded on three fundamental principles:

- the right of citizens to a clean and healthy environment;
- local community and private sector participation in natural resources management; and
- obligatory EISA of major development projects in all sectors.

The overall objective of the NEAP is to integrate environmental concerns into Zambia's social and economic development planning process.

2.2.1.5 National Forestry Policy

The mission statement of the forestry sector is to ensure sustainable flow of wood and non-wood forest products and services while at the same time ensuring protection and maintenance of biodiversity for the benefit of the present and future generations. The Policy is based on the following principles:

- Ensure sustainable forest resources management;
- Develop capacity of stakeholders in sustainable forest resources management and utilization;
- Promote a participatory approach to forest development by developing close partnership among stakeholders;
- Facilitate private sector involvement in forestry development;
- Promote equitable participation by women, men and children in forestry development; and

- Adopt an integrated approach, through intra and inter-sectoral coordination in forestry sector development.

2.2.1.6 National Decentralization Policy

The National Decentralization Policy (established in 2002, launched in 2004) aimed at decentralizing government responsibilities and functions to lower levels of government through 'devolution'. It reaffirms the local authorities as the institutions responsible for water supply and sanitation.

2.2.1.7 National HIV/STI/TB Policy

The policy highlights government's vision to prevent and control the spread of HIV and AIDS, promote care for those who are infected and affected, and reduce the personal, social and economic impact of the epidemic and forms the basis for the development of the National HIV and AIDS Strategic Framework.

2.2.1.8 National HIV and AIDS Strategic Framework

The country is still using the 2017-2021 National HIV/AIDS Strategic Plan (NASF) anchored on the vision of having "a nation free from the threat of HIV by 2030." Within this vision, government seeks to rapidly and inclusively control the HIV epidemic by fast-tracking the multisectoral response and scaling up prioritised actions that are responsive to the public health needs of the country. The strategic framework therefore highlights the following nine primary focus areas;

- Social and Behaviour Change Communication (SBCC) to promote sustained positive behaviours using different methods and approaches such as one-to-one talks; group discussions; community dialogues; individual and group counselling; advocacy; drama; and, mass media and social media platforms.
- Comprehensive Condom programming to ensure individuals have access and use condoms properly as a critical step to HIV prevention and prevention of unintended pregnancies.
- Voluntary Medical Male Circumcision, facilitating access and provision of safe male circumcision services and increase the number of HIV negative males, including neonates, accessing safe male circumcision services as an additional HIV prevention measure.
- Sexually Transmitted Infections: The NASF seeks to support improved screening and management of STIs as an integral component of the HIV prevention strategy given that other STIs increase susceptibility to HIV infection.
- HIV Testing Services: The strategy emphasises promotion of HIV testing as an entry point for HIV prevention, treatment, care and other relevant support services, and as a strategy that will support the government's efforts towards achieving the first 90 (90% of the population know their HIV status) of UNAIDS and WHO HIV Fast-Track strategy.
- Elimination of Mother to Child Transmission: This thematic area seeks to reduce new infant and paediatric HIV infections for the mother and improve the survival of children and their mothers within the context of HIV infection.
- Treatment of HIV, AIDS, other STIs and TB: This target expanding quality treatment coverage to reach all the PLHIV to ensure quality healthy lives, reduced new HIV infections, morbidity and mortality by improving linkage to care, counselling, and diagnostics to enhance timely initiation on ART, among other intervention.
- Critical enablers: This area promotes transparent and accountable leadership and cooperate governance in HIV programming, recognising that sustained political, national, provincial, district and community levels and institutional/organizational leadership and commitment is essential to ensuring an effective and focused multi-sectoral response. This focus area further identifies gender equality, equity and empowerment as critical social determinants for HIV infection

prevention. Specifically, gender inequalities in access to HIV prevention and care information and gender-based violence undermine HIV prevention efforts and place women, girls and persons with disability at a higher risk. Therefore, HIV prevention efforts at any level must pay attention to existing inequalities and GBV and integrate them into HIV interventions.

- Synergies with other development sectors: Government calls on all socio-economic development sectors to fully integrate HIV prevention and care in their activities to ensure all citizens are able to equally access relevant HIV services and support.

In this regard, the VFU-CEL project implementation will ensure effective contribution to these government's efforts by ensuring that HIV/AIDS and other STI measures are part of the Contractors planned activities.

2.2.1.9 National Gender Policy

The 2014 National Gender Policy serves as a gender mainstreaming institutional framework guiding government ministries and development partners working in Zambia to ensure the attainment of gender equality in the development processes by redressing the existing gender imbalances. The policy dictates the need equal opportunities and participation of women, men and youth in national development.

Implementation of the gender policy is overseen by the Office of the President through the Gender Division; formally called the Ministry of Gender. Placing the Gender Division under the Office of the President was done in 2021 to emphasis government's commitment to gender integration and to provide strong accountability under presidential supervision.

To resolve the problems pertaining to the provision of safe and clean water, and good sanitation which affects women more than men, government has put the following measures in the National Gender Policy: The Government will:

- Promote and encourage the involvement of women and youth in the decision-making processes in the provision of safe and clean water and improvement of sanitation facilities;
- Encourage partnerships between women, men and youth in the provision of water and sanitation;
- Ensure use of gender friendly technology in water supply and sanitation to all members of the community especially persons with disabilities;
- Devise a mechanism to ensure that water and sanitation facilities companies provide affordable, clean, and safe water through a regulator; and
- Establish investment mechanisms to ensure that water reticulation systems take into account issues of hygiene to prevent water borne diseases.

The above measures are the guidelines in the water and sanitation sector. It is expected that all government projects on water supply and sanitation will adhere to the requirements of the 2014 National Gender Policy, particularly in the incorporation of gender issues as per the above translation and with reference to other national guidelines like the Community Development Fund (CDF) guidelines that cast more light on how to promote women and youth participation for example. The composition of water committees is 50% women as a way of promoting participation of women in development activities in peri-urban areas and labour acquisition is 100% local labor for unskilled work and first priority for local subcontractors, with 70% allocated to women and youth subcontractors, unless where this is not possible in the project area.

Therefore, the implementation of the solar plant project will be in accordance with the requirements of the Gender policy as translated by the Ministry of Water Development and Sanitation.

2.2.2 National Legislation

The following are the national legislations relevant to the project:

2.2.2.1 Zambian Constitution 1996

The Zambian Constitution (as amended by Act Number 18 of 1996), does not specifically state that citizens have the right to a clean and healthy environment. However, it pledges: “....to ourselves that we shall ensure that the State shall respect the rights and dignity of the human family, uphold the laws of the State and conduct the affairs of the State in such a manner as to preserve, develop, and utilize its resources for this and future generations”.

The Constitution is the supreme law of the land, and all activities have to comply with the provisions contained therein.

2.2.2.2 Environmental Management Act No. 12 of 2011

The principal legislation governing environmental management in Zambia is the Environmental Management Act 2011 (EMA). The EMA provides for the sustainable management of natural resources and protection of the environment, and the prevention and control of pollution. Of particular relevance is section 29 of the Act which states that:

“A person shall not undertake any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval”.

The Act also provides for public participation in decision-making and access to environmental information. The EMA and its regulations provide the overall environmental regulatory framework for the project.

The projects that require preparation of ESIS reports must be approved by ZEMA prior to implementation. Section 29 of the Act specifically states that “a person shall not undertake any project that may have an effect on the environment without the written approval of the Agency, and except in accordance with any conditions imposed in that approval”.

The Environmental Impact Assessment Regulations, 1997 (Statutory Instrument No. 3 of 2026) specifies the requirements for an ESIA and it also set out in its Second Schedule projects for which EISs are applicable. It provides specific guidelines for conducting environmental impact assessments and for evaluation of environmental impact statements. The regulations require project developers undertaking projects that may have significant effect on the environment to conduct environmental impact assessment prior to obtaining written approval from ZEMA on implementation of the project. Regulation 3 of the Instrument specifically states that “A developer shall not implement a project for which a project brief or an environmental impact statement is required under these Regulations, unless the project brief or an environmental impact assessment has been concluded in accordance with these Regulations.

2.2.2.3 The Water Resource Management Act, No. 21 of 2011

The Act was promulgated to establish the Water Resources Management Authority (WARMA) and define its functions and powers; provide for the management, development, conservation, protection and preservation of water resource and its ecosystems; provide for the equitable, reasonable and sustainable utilization of the water resource; ensure the right to draw or take water for domestic and non-commercial purposes, and that the poor and vulnerable members of the society have an adequate and sustainable source of water free from any charges; create an enabling environment for adaptation to climate change; provide for the constitution, functions and composition of catchment councils, sub-catchment councils and

water users associations; provide for international and regional co-operation in, and equitable and sustainable utilization of, shared water resources; provide for the domestication and implementation of the basic principles and rules of international law relating to the environment and shared water resources as specified in the treaties, conventions and agreements to which Zambia is a State Party.

- The legislation also provides for the sustainable utilization of the water resource and provides for the right to draw or take water for domestic and non-commercial purposes. The Act requires that a person who intends to drill a borehole informs the Authority before any construction begins. The Act further demands that commercial abstraction of water be done with the permission of the Authority.
- The Act also requires that any defective borehole which encounters brackish water or other substances, shall be securely cased, plugged, or sealed off by the owner of the borehole so that the brackish water or other substance shall be confined to the strata in which it was found.
- The Act specifies which activities do not require permits:

“Subject to the requirements, limitations and conditions specified by, or under, the Act, a permit shall not be required for:

- the use of water, from any water resource, for domestic and non-commercial purposes by a person having lawful access to it;
- the development or use of ground water for domestic and non-commercial purposes;
- the harvest of any rainwater from any facility not specified in paragraph (g) of section 71;
- the investigation of the presence of water in any aquifer of the quality or quantity of ground water; or
- ascertaining the effect of using water from any borehole or water works or the level of water in any other borehole or water works on any water resource.”

Section 71 of the Act lists activities where permits are required:

Subject to this Act, a person who intends to—

- use water for purposes specified under section 60 (i.e. use of water for domestic or non-commercial purposes; environmental purposes; training and research purposes; municipal purposes; agricultural purposes; industrial purposes; hydro-electric purposes; mining purposes; navigational purposes; supply of water in bulk and any other purposes as may be specified by the Board) other than for the domestic purposes specified under section 70,
- construct, acquire any water works, impound, supply or distribute water from any water works or borehole to any other person;
- de-water any mine, quarry or water works;
- drain any swamp, marsh, dambo, wetland, re-charge area or other land;
- construct or acquire any water works for the purpose of draining into, conserving or utilizing, in any manner whatsoever, water from a water resource;
- construct water works necessary to restore the course of a water resource that has changed its course;
- harvest any rainwater by means of a dam, weir or barrage that is on a water resource;
- conduct any operation that would interfere with the bank or course of a watercourse;
- sink, deepen or alter any borehole for any purpose in a water shortage area; or
- carry out any activity in relation to a water resource as may be prescribed; shall apply for a permit and pay such charges, for the use of the water, as may be prescribed.”

In conformity with the Act, project activities that fall into the categories above (abstraction of the water from boreholes, waterway works, dams, weirs) will be done under license and specifications obtained from the WARMA.

2.2.2.4 Occupational Health and Safety Act No. 36 of 2010

The Occupational Health and Safety Act, No. 36 of 2010 establishes the Occupational Health and Safety Institute as a body corporate with perpetual succession and defines its composition, powers, and functions. The following sections are relevant to the proposed project:

Section 11. An employer of ten or more persons at any workplace shall establish a health and safety committee.

Section 16. (1) Notwithstanding any other written law, an employer shall:

- (a) *Ensure, so far as is reasonably practicable, the health, safety and welfare of the employees of the employer at a workplace; and*
- (b) *Place and maintain an employee in an occupational environment adapted to the employee's physical, physiological and psychological ability.*

The project will employ people during its development phases (construction, operation and decommissioning phases). Other persons other than persons at work might be exposed to environment at the project site. The health, safety and welfare of all persons at workplaces at the project site should be taken into account.

The project developer shall comply with the Act by ensuring, so far as is reasonably practicable, the health, safety and welfare of all the employees. It shall place and maintain employees in an occupational environment adapted to meet the employees' welfare as required under the Act. The developer shall further provide, among other provisions, systems of work that are safe and without any risks to human health as required under the Act.

2.2.2.5 Energy Regulation Act No. 12 of 2019

In conjunction with ZEMA, the Energy Regulation Board formulates measures to minimize the environmental impact of the production and supply of energy and the production, transportation, conversion, storage and use of fuels and enforces such measures by the attachment of the appropriate conditions to licenses held by the undertaking.

A license from the Energy Regulation Board of Zambia (ERB) will be required prior to commencement of the operation phase of the project.

The design, construction and operation of the energy plant will comply with the standards of the Act.

2.2.2.6 Local Government Act No 17 of 2019

The Act provides for the establishment of Councils in districts, the functions of local authorities and the local government system of which some of the functions relate to pollution control and protection of the environment in general. Ss 69 and 70 of the Act give powers to Councils to impose levies on property, business or commodity as well as fees, respectively. The Councils are also given powers in s 76 to impose by laws for the good rule and government of their jurisdiction and, more particularly:

- for controlling any of the things which, and any of the persons whom, it is empowered by or under this Act to control; and
- for providing for the issue or supply of licenses permits, certificates and other instruments and documents.

The developer will obtain all necessary licenses and permits required for the project development.

2.2.2.7 National Council for Construction Act, No 10 of 2020

This Act provides for the establishment of the National Council for Construction and to define its functions; to provide for the promotion and development of the construction industry in Zambia; to provide for the registration of contractors; to provide for the affiliation to the Council of professional bodies or organizations whose members are engaged in activities related to the construction industry; to provide for the regulation of the construction industry; to provide for the establishment of the Construction School; to provide for the training of persons engaged in construction or in activities related to construction; and to provide for matters connected with or incidental to the foregoing. Applicable sections of this Act include:

- Part II, The National Council for Construction
- Section 5(f), sets and implements safety standards for the construction industry, in collaboration with an appropriate authority
- Part III, Registration of contractors
- Section 11(1) A person shall apply to the Council for registration as a contractor in the prescribed manner and form on payment of the prescribed fee
- Section 12(1) upon registration the council shall issue the applicant with a certificate of registration

The Act is relevant to the project as all contractors and subcontractors to work on the project shall be those registered with National Construction Council. All of them have to comply with the requirements of the Council in the execution of the project.

The Land Act of 1995

Under the Land Act of 1995, land has been divided into the following categories; state, local authority and traditional land. The Act safeguards the administration of land in Zambia. Applicable sections of this include issues pertaining to;

- Part II section 3 (a-g): Land administration
- Part II Section 5 (1): transfer of land

The developer will confine project activities to the pieces of land that have been designated for this kind of development.

2.2.2.8 Water Supply and Sanitation Act, No. 28 of 1997

The Act provides for the establishment of the National Water Supply and Sanitation Council (NWASCO) and defines its functions. It also provides for the establishment of water supply and sanitation utilities by local governments and ensures the efficient and sustainable supply of water and sanitation services. It further mandates NWASCO to regulate the sector in a manner leading to improved delivery, efficiency, and sustainability. Applicable sections of this Act include:

- Part II, Section (4) "...the function of the Council shall be to do all such things as necessary to regulate the provision of water supply and sanitation services."
- Part IV, Section (11): "A utility or a service provider shall not operate except in accordance with this Act and under authority of a licence issued under this Act."
- Part IV, Section (16) (a): "A utility or service provider issued with a licence ...shall...construct and maintain water supply service lines and where necessary, according to its licence, sewer system to the boundary of a consumers' property."

The Act regulates water supply and sewerage utilities for the purpose of protecting consumers from unjustified tariffs. All water utilities are licenced and regulated by NWASCO. Water utilities adhere to the provisions of this Act in ensuring the provision of water supply and sanitation services to the areas within their jurisdiction.

2.2.2.9 Employment Code Act No. 3 of 2019

The Act is to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provides for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provides for employment entitlements and other benefits; provides for the protection of wages of employees; provides for the registration of employment agencies; regulate the employment of children and young persons. The following sections are relevant to this project:

- PART III Employment relationship
- Part IV protection of wages
- PART V employment of young children and young persons

The Act is relevant to the project as persons will be required to be employed to work on the project. Compliance will be ensured through following laid down procedures for employing people and effecting necessary conditions of service for the various categories of workers. The developer will employ people to work on this project who might be either permanent employees or on contract basis and will ensure that all recruited personnel on site or other works relating to the project are not minors i.e., below 18 years.

2.2.2.10 National Heritage and Conservation Commission Act of 1989

The Act is responsible for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic, historical, prehistoric, archaeological or scientific interest by preservation, restoration, rehabilitation, reconstruction, adaptive use and good management.

- Section 28 (c i-vi): Entry on land for purposes of surveying
- Section 35: Destruction of Heritage
- Section 36: Actions to protect safety and avoid risk

The actual sites for the proposed project do not accommodate any features which have been confirmed to have cultural or heritage value; however, during site clearing and construction, any discoveries of possible ancient cultural, historical and natural heritage features will be reported to the National Heritage Society as per provisions of this Act.

2.2.2.11 Roads and Traffic Control Act No. 11 of 2002

The Act established the Road Transport and Safety Agency mandated to provide for a system of roads safety and traffic management. Parts V to XIV of the Road and Road Traffic Act CAP 464 of the Laws of Zambia. It established the Road Transport and Safety Agency (RTSA) of which its main function is to implement policy on road transport, traffic management and road safety.

The project will use different vehicles on the road during site preparation, construction, operation and demolition. The developer/contractors will ensure the use of the road in accordance with these regulations. All vehicles/ trucks that will be used by the project will be according to the provisions of this Act.

2.2.2.12 The Zambia Wildlife Act, No. 14 of 2015

The Act provides for the establishment, control and management of National Parks (NP) and for the conservation and enhancement of wildlife ecosystems. Applicable sections of this Act include:

- Section 3: Ownership of Wildlife
- Part VI, section 31: Restriction on hunting game or protected animals
- Part VI, Section 32: detailed wildlife impact assessment

The sites for the project activities are devoid of big game. However, the presence of small mammals, insects, amphibian, birds and reptiles cannot be ruled out. The project developer shall adhere to the provisions of the Act.

2.2.2.13 Workers' Compensation Act, No. 10 of 1999

The Act provides for the establishment and administration of a Fund for the compensation of Workers disabled by accidents or diseases contracted by workers in the course of their employment, and for the payment of compensation to dependents of Workers who die as a result of such accidents or diseases.

Part V Section 51(l) requires that, if an accident or disease occurs to a worker arising out of the course of employment and results in the worker's disablement or death, the worker, or if the worker dies, that worker's dependents shall be entitled to compensation in accordance with the provisions of this Act.

There is a possibility that some workers that will be employed on this project, might be involved in accidents. In case of any accidents occurring to any worker, the developer and its contractors will treat such employees in accordance with these regulations. The developer will ensure that all its employees are registered as provided for under the Workers Compensation Act.

2.2.2.14 Urban and Regional Planning Act No. 3 of 2015

This Act provides for development, planning and administration principles, standards and requirements for urban and regional planning processes and systems. Some applicable sections of this Act include:

Part VI, Section (49):" A person shall not carry out any development on land, change the use of land or subdivide any land without planning permission,"

Approval for plans will be sought by the developer including the change of land use application and land lease for the project site.

2.2.2.15 The Public Road Act No. 12 of 2002

The Public Roads Act provides for the establishment of the Road Development Agency (RDA) responsible for the planning, management and coordination of the road network in Zambia. Part III of this law prohibits road infringement by stipulating dimensions of road reserves within which no construction of any structures is allowed.

- Part VI, Section (76) (1) requires that "No person shall, without the written consent of the Agency, make any excavation in any road."
- Part VI, Section (76) (2)" Where with consent of the Agency, any person makes any excavation in any road, the person shall- (a) at the persons own expense, cause the excavation to be sufficiently fenced; (b) maintain sufficient light in a proper place or near the excavation every night from sunset to sunrise, and (c) fill the excavation up and restore the road to the satisfaction of the Agency as soon as possible after completing any work..."

Deliveries of materials especially for the construction phase will result in a considerable amount of additional traffic on local roads and present on site.

Signs and directions to control traffic movement to ensure a safe environment both in proximity to and within the site will be put in place. The developer will make sure that there are designated routes to and from and within the site, built to national and international specifications and standards.

2.2.2.16 Fisheries Act No 22 of 2011

This is an Act that helps to promote the sustainable development of fisheries and a precautionary approach in fisheries management, conservation and development.

- Section 19 (1) (a) introduce or cause to be introduced into any water any fish of a species not native either to the water into which it is introduced or to other waters naturally connected therewith;
- Pat IX, Section (60) (h): “A person who... dumps or allows to enter or permits to be dumped or discharged in fishery waters anything which or may be injurious to fish, or which may disturb or alter the ecological balance in such waters, or hinders the catching of fish...commits an offence and is liable to a fine...”

All developers working with water need to protect fish resources in the water bodies they work with. No one should discharge any effluent with the potential to cause damage to fish resources.

2.2.2.17 Gender Equity and Equality Act No 22 of 2015

This is an Act that seeks to promote gender equity and equality as a cross-cutting issue in all spheres of life and stimulate productive resources and development opportunities for both sexes, prohibit harassment, victimization and harmful social, cultural and religious practices.

- Part IV, section 14(1e), “both sexes shall have equal access to water rights and property.”
- Part IV, Section 15(1),” A person, public body or private body shall not discriminate against any sex.”
- Part IV, section 16 (1) A person, public body and private body have a duty to uphold the rights of both sexes and to respect and safeguard the dignity of both sexes.
- Part IV, section 16 (2) A person, public body or private body shall not exploit or subject any person to abusive, violent or degrading treatment.
- Part IV, section 16(3) A person who contravenes subsection (2) commits an offence and is liable to prosecution and punishment in accordance with the Anti-Gender Based Violence Act, 2011, and any other law.
- Part V, Section (27) (1),” There shall be no discrimination against women in economic and social life”
- Pat V, Section (4)(a), “A person, public body or private body shall not...create artificial barriers to equal access to employment opportunities by using discriminating recruitment and selection procedures.”

The programme will require the engagement of a work force on contract or permanent basis. The developer will adhere to the provisions of this Act by ensuring its recruitment process does not discriminate against vulnerable groups, and that there is adherence to part IV sections 14, 15 and 16 of the Act to guarantee the dignity and human rights respect of those recruited and project beneficiaries. The VFU-CEL program, will ensure clarity on measures to mitigate or prevent violation of especially part IV section 16(1&2) in contract documents.

2.2.2.18 Anti-Gender Based Violence Act 1 of 2011

This Act seeks to eliminate all forms of gender-based violence (GBV), physical, emotional, economical and psychological (mental) and notes GBV offences are punishable by the Zambia law. The act also provides a framework for supporting GBV survivors. For example, the survivor is entitled to counselling and trauma management. The Act recognizes that while both males and females experience GBV, women, girls and children are particularly vulnerable due to various factors. In many cases, GBV culminates into injury and loss of human life. Sexual gender-based violence including sexual harassment is a major health concern for Zambia, causing physical, emotional and psychological/mental health harm to its victims. The GBV Act offers a comprehensive framework for protection of and a means of survival for victims and survivors of gender-based violence, and prosecution of perpetrators.

The VFU-CEL programme requires adherence to this act by ensuring that all employees and community members especially women, girls and persons with disabilities in the implementation areas are protected from all forms of GBV because of the programme. Although rarely so, different forms of gender-based violence, such as abusive language towards subordinate employees, denial of privileges like maternity leave, sick leave, family emergency leave, religious liberty and sexual exploitation, abuse and harassment (SEAH) in the workplace may occur. GBV may also extend from the workplace where small scale business vendors like women and youths selling their merchandise to the project staff, and thus may be sexually harassed and exploited with promise of more business support. In some instances, project employees may exert economic abuse by disserving their families using work as an excuse. The VFU-CEL Programme shall comply with this Act by ensuring a conducive environment is created where women and men can thrive as partners and where there are cordial relationships between supervisors and subordinates. The programme will further ensure that project staff and those operating near the project site-providing services to the project team are protected from all forms of GBV in the workplace within the framework of this Anti-GBV Act.

2.2.2.19 Forests Act No. 4 of 2015

The Act provides for the conservation and use of forests and trees for the sustainable management of forests ecosystems and biological diversity. It also provides for, among other provisions, the implementation of international agreements such as United Nations Framework Convention on Climate Change, Convention on International Trade in Endangered Species of Wild Flora and Fauna, the Convention on Wetlands of International Importance, especially as Water Fowl Habitat, the Convention on Biological Diversity, the Convention to Combat Desertification in those Countries experiencing Serious Drought and/or Desertification and any other relevant international agreement to which Zambia is a party.

The project will include clearing vegetation at the project site to pave way for construction of the Solar PV Plant. The project developer will comply with the provisions of the Act by avoiding indiscriminate removal, felling or cutting of trees outside the project site footprint.

2.2.2.20 Standards Act, No 4 of 2017

This is an Act that continues the existence of the Zambia Bureau of standards and re-defines its powers and functions. It further provides for the standardization and quality assurance of products and services through the setting of national standards.

Part II, Section (50), "The functions of the Bureau are to -. Administer and maintain standards and ensure conformity with standards.'

In its acquisition of products or services, the developer will ensure to only engage or utilize products and services that conform to the provisions of this Act and meet the pre-defined standards.

2.2.3 Multilateral Environmental Agreements ratified by Zambia

The Table 2-1 summarizes international conventions and agreements which are applicable to the project. The agreements and protocols impose obligations on Zambia to address issues or topics included in these documents.

Table 2-1 : Multilateral agreements ratified by Zambia

Convention	Relevance
United Nations Framework Convention on Climate Change (UNFCCC) ratified in 1996	The convention aims at stabilizing greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The proposed Project will use clean and renewable energy with insignificant contribution to global greenhouse gases.
Convention on Biological Diversity (ratified in 1993)	The objectives the Zambia's National Biodiversity Action Plans include, ensuring the conservation of a full range of Zambia's natural ecosystems through a network of protected areas, development and implementation of strategies for conservation of biodiversity, sustainable use and management of biological resources. Biological resources of significant conservation value that will be identified during Project implementation will be conserved and protected.
Convention Concerning the Protection of World Heritage (1972)	The Convention aims at ensuring the identification, protection, conservation, presentation and transmission to future generations of cultural and natural heritage. Cultural and natural heritage sites that may be identified during implementation of the proposed Project will be protected and conserved in accordance with the provisions of the Convention to which Zambia is party to.
Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989)	The Convention is the most comprehensive global environmental treaty on hazardous and other wastes. It aims at protecting human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.
Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (1993)	CITES is an international agreement between governments to ensure that international trade in specimens of wild animals and plants does not threaten their survival. In all the operations of the proposed project care will be taken to ensure that endangered species are protected
United Nation Convention to Combat Desertification (UNCCD) (1993)	Zambia recognizes the need to control any form of desertification that may arise as a result of anthropogenic activities. The statutes of the UNCCD, encourages the control of desertification as a result of man's activities.
Convention Concerning the Protection of Workers against Occupational Hazards in Working Environnants due to Air Pollution and Noise Vibrations (2006)	Zambia recognizes the need to protect workers against hazards in working environments.
ILO conventions <u>Zambia has ratified several ILO conventions, including:</u> • ILO Conventions No. 87 and 98 on freedom of association and collective bargaining • ILO Conventions No. 29 and 105 on the elimination of forced and compulsory labour • ILO Conventions No. 100 and 111 on the elimination of discrimination in respect of employment and occupation	Zambia is a signatory to the ILO conventions and that in all labour matters, the provisions of these conventions should be adhered to.

• ILO Convention No. 138 on the elimination of child labour • The core ILO Convention on Equal Remuneration	
African Convention on the Conservation of Nature and Natural Resources (1980)	Zambia recognizes the need to contribute to the conservation of nature and natural resources at a continent level.
Ramsar Convention on Wetlands (1991)	To encourage and support countries to develop and implement national policy and legislative frameworks, education and awareness raising programs, as well as inventory, research and training projects on Ramsar The proposed project will ensure that this convention is adhered to during construction, operation and decommissioning phases of the project
Vienna Convention for the Protection of the Ozone Layer (1986)	The States agreed to cooperate in scientific research on the ozone problem, to exchange information, and to adopt “appropriate measures” to prevent activities that harm the ozone layer. The obligations are general and contain no specific limits on chemicals that deplete the ozone layer. The proposed Project will use clean and renewable energy with insignificant contribution to global greenhouse gases. Need to adopt appropriate measures so that not any of the activity of the project contributes to the harming of the ozone layer
Convention on the Elimination of All Forms of Discrimination against Women (CEDAW (1983)	To eliminate all forms of discrimination against women in all areas and promote women’s equal rights in public and private spheres. The convention calls for the elimination of negative traditional gender roles and stereotypes as a start to end all forms of discrimination against women and girls. The treaty emphasizes the need to achieve ‘substantive equality’ or ‘equality of results’, which stresses that there should be equal access, equal opportunities, and equal results for women and girls. The proposed project will ensure that rights of women are considered in the implementation of the project
SADC protocols on gender and development (2013)	Requires SADC member states to provide for the empowerment of women, to eliminate discrimination and to achieve gender equality and equity through the development and implementation of gender responsive legislation, policies, programmes and projects.

2.3 International Standards to be considered

2.3.1 The World Bank Environmental and Social Standards (ESSs)

The ESSs from the World Bank will be used as reference standards for the implementation of due diligence at every stage of the project’ development. A short summary for each ESS is given hereafter.

ESS 1: Assessment and Management of Environmental and Social Risks and Impacts

ESS1 sets out the responsibilities for assessing, managing and monitoring environmental and social risks and impacts associated with each stage of a project supported through Investment Project Financing, to achieve environmental and social outcomes consistent with the Environmental and Social Standards (ESSs). The borrower shall:

- Conduct an environmental and social assessment of the proposed project, including stakeholder engagement.
- Undertake stakeholder engagement and disclose appropriate information in accordance with ESS10; develop an Environmental and Social Commitment Plan (ESCP), and implement all measures and actions set out in the legal agreement including the Environmental and Social Management Plan (ESMP).
- Conduct monitoring and reporting on the environmental and social performance of the project against the ESSs

ESS 2: Labor and Working Conditions

ESS2 recognizes the importance of employment creation and income generation in the pursuit of poverty reduction and inclusive economic growth. The borrower shall promote sound worker-management relationships and enhance the development benefits of a project by treating workers in the project fairly and providing safe and healthy working conditions. The objectives are to:

- Promote safety and health at work.
- Promote fair treatment, non-discrimination, and equal opportunity for project workers.
- Protect project workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate.
- Prevent the use of all forms of forced labour and child labour.
- Support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law.
- Provide project workers with accessible means to raise workplace concerns.

ESS 3: Resource efficiency and pollution prevention and management

ESS3 recognizes that economic activity and urbanization often generate pollution to air, water, and land, and consume finite resources that may threaten people, ecosystem services and the environment at the local, regional, and global levels. The current and projected atmospheric concentration of greenhouse gases (GHG) threatens the welfare of current and future generations. At the same time, more efficient and effective resource use, pollution prevention and GHG emission avoidance, and mitigation technologies and practices have become more accessible and achievable.

This ESS 3 sets out the requirements to address resource efficiency and pollution prevention and management throughout the project life cycle. The objectives are:

- Promote the sustainable use of resources, including energy, water and raw materials.
- Avoid or minimize adverse impacts on human health and the environment by avoiding or minimizing pollution from project activities.
- Avoid or minimize project-related emissions of short and long-lived climate pollutants.
- Avoid or minimize generation of hazardous and non-hazardous waste.
- Minimize and manage the risks and impacts associated with pesticide use.

ESS 4: Community health and safety

ESS4 recognizes that project activities, equipment, and infrastructure can increase community exposure to risks and impacts. In addition, communities that are already subjected to impacts from climate change may also experience an acceleration or intensification of impacts due to project activities. ESS4 addresses the health, safety, and security risks and impacts on project-affected communities and the corresponding responsibility to avoid or minimize such risks and impacts, with attention to people who, because of their circumstances, may be vulnerable. Objectives are to:

- Anticipate and avoid adverse impacts on the health and safety of project-affected communities during the project life cycle from both routine and non-routine circumstances.
- Promote quality and safety, and considerations relating to climate change, in the design and construction of infrastructure, including dams.
- Avoid or minimize community exposure to project-related traffic and road safety risks, diseases and hazardous materials.
- Have in place effective measures to address emergency events.

- Ensure that the safeguarding of personnel and property is carried out in a manner that avoids or minimizes risks to the project-affected communities.

ESS 5: Land Acquisition, restrictions on land use and involuntary resettlement

ESS5 recognizes that project-related land acquisition and restrictions on land use can have adverse impacts on communities and persons. Project-related land acquisition or restrictions on land use may cause physical displacement (relocation, loss of residential land or loss of shelter), economic displacement (loss of land, assets or access to assets, leading to loss of income sources or other means of livelihood), or both. The term “involuntary resettlement” refers to these impacts. Resettlement is considered involuntary when affected persons or communities do not have the right to refuse land acquisition or restrictions on land use that result in displacement. Objectives are to:

- Avoid involuntary resettlement or, when unavoidable, minimize involuntary resettlement by exploring project design alternatives.
- Avoid forced eviction.
- Mitigate unavoidable adverse social and economic impacts from land acquisition or restrictions on land use by: (a) providing timely compensation for loss of assets at replacement cost and (b) assisting displaced persons in their efforts to improve, or at least restore, their livelihoods and living standards, in real terms, to pre-displacement levels or to levels prevailing prior to the beginning of project implementation, whichever is higher.
- Improve living conditions of poor or vulnerable persons who are physically displaced, through provision of adequate housing, access to services and facilities, and security of tenure.
- Conceive and execute resettlement activities as sustainable development programs, providing enough investment resources to enable displaced persons to benefit directly from the project, as the nature of the project may warrant.
- Ensure that resettlement activities are planned and implemented with appropriate disclosure of information, meaningful consultation, and the informed participation of those affected.

ESS 6: Biodiversity Conservation and sustainable management of living natural resources

ESS6 recognizes that protecting and conserving biodiversity and sustainably managing living natural resources are fundamental to sustainable development. Objectives are to:

- Protect and conserve biodiversity and habitats.
- Apply the mitigation hierarchy and the precautionary approach in the design and implementation of projects that could have an impact on biodiversity.
- Promote the sustainable management of living natural resources.
- Support livelihoods of local communities, including Indigenous Peoples, and inclusive economic development, through the adoption of practices that integrate conservation needs and development priorities.

ESS 7: Indigenous peoples/sub-Saharan African historically Underserved traditional local Communities

This ESS7 applies to a distinct social and cultural group identified in accordance with paragraphs 8 and 9 of this ESS. The terminology used for such groups varies from country to country, and often reflects national considerations. ESS7 uses the term “Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities,” recognizing that groups identified under paragraphs 8 and 9 may be referred to in different countries by different terms. Such terms include “Sub-Saharan African historically underserved traditional local communities,” “indigenous ethnic minorities,” “aboriginals,” “hill tribes,” “vulnerable and marginalized groups,” “minority nationalities,” “scheduled tribes,” “first nations” or “tribal groups.” For the purposes of this ESS, the term “Indigenous Peoples/Sub-Saharan African

Historically Underserved Traditional Local Communities" includes all such alternative terminology. Objectives are to:

- Ensure that the development process fosters full respect for the human rights, dignity, aspirations, identity, culture, and natural resource-based livelihoods of Indigenous Peoples/ Sub-Saharan African Historically Underserved Traditional Local Communities.
- Avoid adverse impacts of projects on Indigenous Peoples/sub-Saharan African Historically Underserved Traditional Local Communities, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts.
- Promote sustainable development benefits and opportunities for Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities in a manner that is accessible, culturally appropriate and inclusive.
- Improve project design and promote local support by establishing and maintaining an ongoing relationship based on meaningful consultation with the Indigenous Peoples/sub-Saharan African Historically Underserved Traditional Local Communities affected by a project throughout the project's life cycle.
- Obtain the Free, Prior, and Informed Consent (FPIC) of affected Indigenous Peoples/ Sub-Saharan African Historically Underserved Traditional Local Communities in the three circumstances described in this ESS.
- Recognize, respect and preserve the culture, knowledge, and practices of Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities, and to provide them with an opportunity to adapt to changing conditions in a manner and in a timeframe acceptable to them.

ESS 8: Cultural heritage

ESS8 recognizes that cultural heritage provides continuity in tangible and intangible forms between the past, present and future. This ESS sets out general provisions on risks and impacts to cultural heritage from project activities. ESS7 sets out additional requirements for cultural heritage in the context of Indigenous Peoples. ESS6 recognizes the social and cultural values of biodiversity. Provisions on Stakeholder Engagement and Information Disclosure are set out in ESS10. Objectives are to:

- Protect cultural heritage from the adverse impacts of project activities and support its preservation.
- Address cultural heritage as an integral aspect of sustainable development.
- Promote meaningful consultation with stakeholders regarding cultural heritage.
- Promote the equitable sharing of benefits from the use of cultural heritage.

ESS 9: Financial Intermediaries

ESS 9 recognizes the importance of Financial Intermediaries (FIs) in mobilizing capital and supporting sustainable development. Where project financing is provided through a Financial Intermediary, the Borrower shall ensure that the FI establishes and maintains an Environmental and Social Management System (ESMS) to appropriately manage environmental and social risks and impacts of subprojects. The FI shall screen, assess, and monitor subprojects to ensure they are implemented in a manner consistent with the Environmental and Social Standards (ESSs).

The objectives are to:

- Ensure that Financial Intermediaries put in place appropriate environmental and social risk management procedures.
- Promote good environmental and social risk management practices in subprojects financed by Financial Intermediaries.

- Ensure that subprojects are screened and categorized according to their environmental and social risks and impacts.
- Require Financial Intermediaries to monitor subprojects and ensure compliance with national law and relevant Environmental and Social Standards.
- Exclude financing of activities that are likely to cause significant adverse environmental or social impacts that are irreversible or unprecedented.
- Promote transparency and accountability through reporting on environmental and social performance.

ESS 10: Stakeholder Engagement and Information Disclosure

This ESS recognizes the importance of open and transparent engagement between the Borrower and project stakeholders as an essential element of good international practice. Effective stakeholder engagement can improve the environmental and social sustainability of projects, enhance project acceptance, and make a significant contribution to successful project design and implementation.

Stakeholder engagement is an inclusive process conducted throughout the project life cycle. Where properly designed and implemented, it supports the development of strong, constructive and responsive relationships that are important for successful management of a project's environmental and social risks. Stakeholder engagement is most effective when initiated at an early stage of the project development process and is an integral part of early project decisions and the assessment, management and monitoring of the project's environmental and social risks and impacts. This ESS must be read in conjunction with ESS1. Requirements regarding engagement with workers are found in ESS2. Special provisions on emergency preparedness and response are covered in ESS2 and ESS4. In the case of projects involving involuntary resettlement, Indigenous Peoples or cultural heritage, the Borrower will also apply the special disclosure and consultation requirements set out in ESS5, ESS7 and ESS8. Objectives are to:

- Establish a systematic approach to stakeholder engagement that will help Borrowers identify stakeholders and build and maintain a constructive relationship with them, in particular project-affected parties.
- Assess the level of stakeholder interest and support for the project and to enable stakeholders' views to be considered in the project design and environmental and social performance.
- Promote and provide means for effective and inclusive engagement with project-affected parties throughout the project life cycle on issues that could potentially affect them.
- Ensure that appropriate project information on environmental and social risks and impacts is disclosed to stakeholders in a timely, understandable, accessible and appropriate manner and format.
- Provide project-affected parties with accessible and inclusive means to raise issues and grievances and allow Borrowers to respond to and manage such grievances.

2.3.2 Gap analysis between WB/ESS Standards and Zambian policies

The Table below gives the relevant World Bank E&S requirements for the VFU-CEL project and indicates if they are covered by the Zambian regulatory and policy process. When gaps are identified, actions to be taken are given:

Table 2-2 : Gap analysis between WB/ESS Standards and Zambian policies

Environnemental and Social Standard (ESS)	Key Requirements of ESS relevant to the VFU-CEL project	ZAMBIAN Regulation(s)	Gap	Actions
ESS1: Assessment and Management of Environmental Risk and Impacts	The Borrower will carry out an environmental and social assessment of the project to assess the environmental and social risks and impacts of the project throughout the project life cycle. The assessment will be proportionate to the potential risks and impacts of the project and will assess, in an integrated way, all relevant direct, indirect and cumulative environmental and social risks and impacts throughout the project life cycle	The Environmental Management Act No. 12 of 2011 The Environmental Management (Strategic Environmental Assessment) Regulations; SI 48 Of 2021 The Gender Equity and Equality Act No 22 of 2015	No gaps exist. The Zambian law on environmental assessment is adequate and covers aspects of the WB EES1	Requirements provided by the Zambian law to be applied. Screening of sites will be conducted by ZEMA to determine environmental safeguard instrument to be prepared for each site (result of the screening maybe a no objection with conditions or ESIA)
ESS2: Labor and Working Conditions	The Borrower will develop and implement written labour management procedures applicable to the project.	Employment Code Act No. 3 of 2019 Occupational Health and Safety Act No. 36 of 2010 The Gender Equity and Equality Act No 22 of 2015 Public Health Act	There are no gaps between the ESS2 and the Zambian law on issues of labour including gender issues. The Employment Code and the Occupational Health and Safety Act s provide for labour issues while the The Gender Equity and Equality Act provide for gender issues while Public Health Act provides for the health and safety of the public/communities	Requirements provided by the Employment Code Act, Occupational Health and Safety Act, the Gender Equity and Equality Act and the Public Health Act will be applied
ESS3: Resource Efficiency and Pollution Prevention and Management	The Borrower will consider ambient conditions and apply technically and financially feasible resource efficiency and pollution prevention in accordance with the mitigation strategy	The Environmental Management Act No. 12 of 2011 The Environmental Management (Licensing) Regulations No. 112 of 2013 The Solid Waste Regulation and Management Act No. 20 of 2018	No gap exists. The Zambian law is compliant to WB ESS3. The Zambian law provides for the discharge of sewage and other solid waste such as pumps and other water equipment.	Requirements provided by the Environmental Management and The Solid Waste Regulation and Management Act to be applied. Documenting standard operating procedures after replacement to be followed
ESS4: Community Health and Safety	The Borrower is responsible to avoid or minimize health, safety and security risks and impacts on project affected	The Environmental Management Act No. 12 of 2011 Employment Code Act No. 3 of 2019	The Zambian law includes provisions on Community Occupational Health and Safety. No gaps between the Zambian law and the WB ESS4	Zambian law to be applied as it is in line with WB ESS4

Environmental and Social Standard (ESS)	Key Requirements of ESS relevant to the VFU-CEL project	ZAMBIAN Regulation(s)	Gap	Actions
	communities, with attention to people may be vulnerable	The Gender Equity and Equality Act No 22 of 2015 Public Health Act of 1996		
ESS5: Land Acquisition, Restrictions on Land Use, and Involuntary Resettlement	Where involuntary resettlement is unavoidable, it will be minimized and appropriate measures to mitigate adverse impacts on displaced persons (and on host communities receiving displaced persons) will be carefully planned and implemented.	There are no specific regulations that govern involuntary resettlement in Zambia, but a National Resettlement Policy was adopted in 2016 through the office of the Vice President.	There is no specific law dealing with resettlement and compensation of project affected persons in Zambia however The Environmental Management Act No. 12 of 2011, SI No 3 of 2026 (Environmental Impact Assessment Regulations and the Resettlement Policy was adopted in 2016 through the office of the Vice President make provisions for the relocation and compensation of project affected persons	ESS 5 provisions to be applied where issues of involuntary resettlement arise (WB). In case of involuntary resettlement, the developer will prepare either a full resettlement Action Plan (RAP) (<i>where it is determined that households have to be physically relocated</i>) or Livelihood Restoration and Compensation Plan (LRCP) (<i>where it is determined that only things such as crops of temporal effect on businesses will occur</i>)
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	The EIA will consider threats to biodiversity, identify risks and impacts, and manage them with appropriate mitigation strategy.	ZEMA is in charge of Biodiversity concerns The Zambia Wildlife Act No.14 of 2015 The Forest Act No. 4 of 2015	To be addressed by ZEMA during ESIA/ESMP procedure. No gaps between the Zambian law and WB	To be monitored during construction works
ESS7: Indigenous peoples/sub-Saharan African historically underserved traditional local Communities	Avoid adverse impacts of projects on Indigenous Peoples/sub-Saharan African Historically Underserved Traditional Local Communities, or when avoidance is not possible, to minimize, mitigate and/or compensate for such impacts.	In Zambia there is no specific regulation for indigenous people because there is no community classified as indigenous people (according to definition given in paragraphs 8 and 9 of ESS7). However local communities and vulnerable groups are cared for in the following Acts: The Environmental Management Act No. 12 of 2011	In Zambia, no communities are classified as indigenous people in the context of the definition of the term. However, in terms of local people or local communities, there is adequate laws providing for avoidance of adverse impacts of projects on these people. Zambian law only provides for local people. Local people are local communities who are directly affected by the project and	Same as for ESS5 and ESS4

Environmental and Social Standard (ESS)	Key Requirements of ESS relevant to the VFU-CEL project	ZAMBIAN Regulation(s)	Gap	Actions
		The Environmental Management (Strategic Environmental Assessment) Regulations; SI 48 Of 2021 The Gender Equity and Equality Act No 22 of 2015 Public Health Act of 1996	these may include vulnerable groups. ESS7 will not be triggered in any way. However,	
ESS8: Cultural Heritage	The EIA will determine the potential risks and impacts of the proposed activities of the project on cultural heritage.	National Heritage and Conservation Commission Act No 19 of 2021 A chance to find procedure may be triggered during detailed design, ESIA and works activities.	To be addressed by ZEMA during ESIA/ESMP procedure	Some sites are within or close to areas designated as heritage sites. Therefore, there is need to adhere to the WB and NHCC Act of 2021. Many of the sites do not accommodate any features which have been confirmed to have cultural or heritage value; however, during the project, any discoveries of possible ancient cultural, historical and natural heritage features will be reported to the National Heritage Society as per provisions of this Act. Studies indicating no harm should be undertaken should threats to water levels for various reasons even drought. This may just be water monitoring reports to ensure compliance. This however, is not anticipated for this project

Environmental and Social Standard (ESS)	Key Requirements of ESS relevant to the VFU-CEL project	ZAMBIAN Regulation(s)	Gap	Actions
ESS10: Stakeholder Engagement and Information Disclosure	The Bank recognizes the importance of early and continuing engagement and meaningful consultation with stakeholders. The Bank will require the Borrower to engage with stakeholders, including communities, groups, or individuals affected by proposed projects, and with other interested parties, through information disclosure, consultation, and informed participation in a manner proportionate to the risks to and impacts on affected communities.	The Environmental Management Act No. 12 of 2011 SI No 3 of 2026 (Environmental Impact Assessment Regulations Of 1997 Consultation and disclosure are required during the ESIA/EPB procedure and approval process.	No gaps exist. The Zambian EIA approval process includes continuous engagement of stakeholders at all stages from scoping, baseline studies, impact analysis and final decision making throughout the lifecycle of the project.	Zambian law to be applied as it is in line with WB ESS10 - Stakeholders will be consulted throughout the lifecycle of the project - Stakeholders will be provided with timely, relevant, understandable and accessible information, and consult with them in a culturally appropriate manner, which is free of manipulation, interference, coercion, discrimination and intimidation - The process of stakeholder engagement will involve the following: (i) stakeholder identification and analysis; (ii) planning how the engagement with stakeholder will take place; (iii) disclosure of information; (iv) consultation with stakeholders; (v) addressing and responding to grievances; and (vi) reporting to stakeholders

Note: The solar plant project does not trigger ESS9 (financial intermediaries)

2.4 Other relevant considerations

2.4.1 Integration of the Human Rights based Approach

It is imperative that the VFU-CEL's program stakeholders, the contractors and subcontractors that will be engaged in the implementation of the various program components, uphold and promote human rights standards related to this program. These stakeholders will be held responsible and accountable to respecting, protecting and fulfilling human rights. They are expected to ensure that the rights-holders (individuals and communities) in the program areas and those working for the listed stakeholders are aware of their rights and that their capacities to claim their rights are built. This will be achieved through the following suggested expected interventions (the Contractors can expand on this list):

- Workplace and community sensitization of respective rights.
- Development and implementation of project and community (interfaced) grievance mechanism.
- Orientation of the foreign Contractors in collaboration with the local leadership and line ministries on local expectations and cultural norms to minimise community conflict with the project staff.
- Promotion of youth, women and person's with disabilities' meaningful participation in project direct and indirect activities/benefits by ensuring non-discrimination and inequalities in recruitment process, access to information on available opportunities and creation of conducive gender-responsive work environments, such as having female and disability friendly toilets and WASH rooms (samples for reference are attached in the annexes), decent accommodation in camps and free SEAH and GBV workplaces. To ensure meaningful participation of often marginalised groups (women, persons with disabilities and to some extent youths and men in poverty situations), developer will be encouraged to ensure that any leadership and governance structures, including grievance structure established at community level are representation of these groups and that they are part of decision making. Similarly, the Contractors will be expected to recruit women, youths and persons with disabilities in meaningful technical and non-technical employment/roles that significantly build their skills and improve their economic status.
- Promote meaningful community participation: it is expected that all program stakeholders will be accountable to communities for whom the VFU-CEL benefits are intended. This will involve transparency in recruitment, community engagements to allow communities to express their views and consideration of these views during the VFU-CEL implementation and beyond.

Promotion of accountability through established channels like the grievance mechanisms. It is important that the stakeholders (Contractors, Communities and relevant line Ministries) in the project areas hold each other to account in the promotion and protection of human rights. Particularly, the rights-holders' holders must be supported to access and utilize systems in place for claiming their rights such as access to justice and compensation.

3 PROJECT DESCRIPTION

3.1 Location

The project site is located in Chief Sekute's area - Kazungula District, Southern Province, Zambia.

Access to the Site

If approached from Livingstone, the site is accessed via the M10 Road (Livingstone–Sesheke Road) heading toward Kazungula. Upon entering Kazungula town centre, proceed past the ZESCO Limited Kazungula Substation. From the substation, the project site is approximately 1.5 km ahead along the M10. Continuing along the M10, pass the junction of the M10 Road and the A33 Road, which provides access to the Kazungula Bridge. This junction is approximately 950 metres before reaching the project site. After passing this junction, prominent public buildings appear on the right-hand side of the M10, these are Kazungula District Administration Offices, the Kazungula Civic Centre, and the Constituency Office. The proposed project site is located approximately 100 metres off the M10 Road on the right-hand side, shortly after these administrative buildings.

On the left-hand side of the M10, directly opposite the project site area, is the Kazungula District Hospital, situated approximately 1.1 km from the main road (M10). The north-western, northern, north-eastern, eastern, and south-eastern sides of the site are predominantly undeveloped land. There are no settlements within the project footprint. Nearby infrastructural features have been identified and mapped, and will be taken into account during project planning, construction, and operation to ensure that potential environmental and social impacts are minimized. The specific geographic coordinates for the site are provided in Table 3-1 below. The project boundary is clearly delineated in Figures 3-1 and 3-2.

Table 3-1: Coordinates of the Project Area

NO.	LATITUDE	LONGITUDE
1	17°45'09"S	25°16'45"E
2	17°45'18"S	25°16'57"E
3	17°45'49"S	25°16'34"E
4	17°45'43"S	25°16'26"E
5	17°45'36"S	25°16'24"E



Figure 3-1: Location of the project

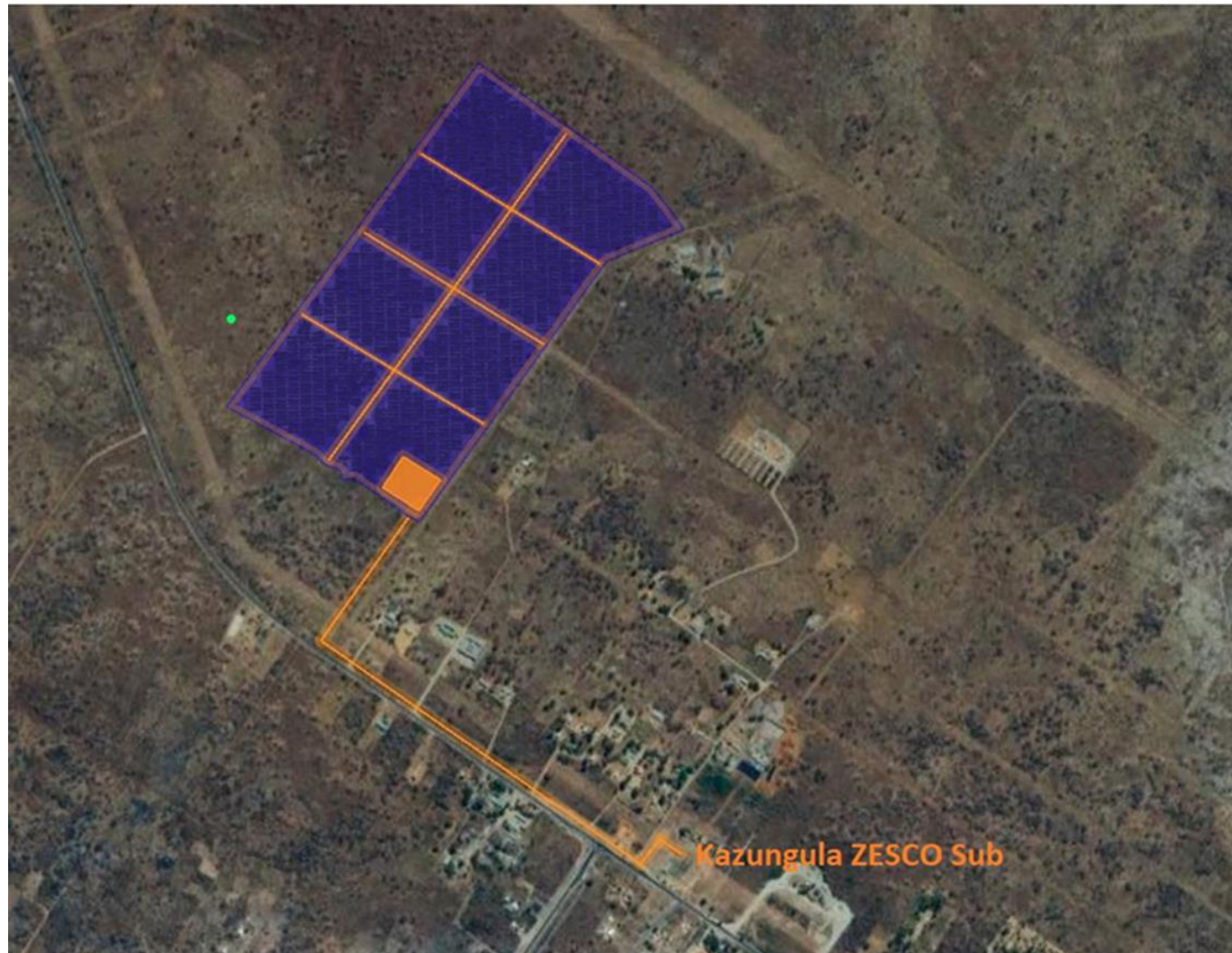


Figure 3-2: Indicative plant design for Kazungula Solar Project

3.2 Nature of Project

The proposed project involves the development, construction, operation, and maintenance of a utility-scale, grid-connected solar photovoltaic (PV) power plant with an installed capacity of approximately 38 MW in Kazungula District, Southern Province, Zambia. The project is intended to generate clean, renewable electricity for export to the national grid, thereby supporting energy diversification, improving reliability of power supply, and reducing greenhouse gas emissions. It encompasses all activities associated with renewable energy development, including installation of solar PV modules and electrical infrastructure, grid interconnection, and long-term operation and maintenance, and is designed to contribute to sustainable socio-economic development and climate resilience in Zambia.

3.3 Components and Activities

The major component of the project is the construction of a utility-scale, grid-connected solar photovoltaic (PV) power plant with an installed capacity of approximately 38 MWac. It also encompasses all activities associated with renewable energy development, including installation of solar PV modules and electrical infrastructure, grid interconnection, and long-term operation and maintenance.

3.3.1 Equipment

The proposed Kazungula Solar Photovoltaic (PV) Project will utilise proven, commercially available, and industry-standard equipment to ensure efficient, safe, and reliable electricity generation throughout the project lifecycle. The main equipment will include solar photovoltaic modules mounted on fixed-tilt or single-axis tracking structures, selected for high efficiency, durability, and suitability to local climatic conditions. Power conversion will be achieved through central or string inverters, which will convert direct current (DC) generated by the PV modules into alternating current (AC) suitable for grid export.

Additional electrical equipment will comprise step-up transformers, switchgear, protection and control systems, and a PV switch station to facilitate safe power evacuation and grid interconnection. Balance-of-plant equipment will include mounting structures, DC and AC cabling, combiner boxes, monitoring and supervisory control systems (SCADA), and lightning and earthing systems. Construction equipment such as excavators, cranes, pile drivers, trucks, and compactors will be used during the installation phase, while operational equipment will include routine maintenance tools, cleaning systems for PV modules, and fire-fighting and safety equipment to support efficient and safe plant operation.

Site preparation

This phase will generally consist of clearing of the site and acquisition of raw materials for the construction work.

Raw Materials

The construction and operation of the Kazungula Solar Photovoltaic (PV) Project will require the following key materials:

- Solar photovoltaic (PV) modules
- Mounting structures (galvanised steel or aluminium frames and supports)
- Inverters (string or central inverters)
- Step-up transformers
- Switchgear and protection equipment
- Direct current (DC) and alternating current (AC) electrical cables
- Combiner boxes and junction boxes
- Concrete (for foundations, equipment pads, and support structures)
- Sand and gravel (for concrete works and site preparation)

- Water (for construction activities and panel cleaning)
- Fencing materials (posts, wire mesh, gates)
- Access road construction materials (laterite, gravel, crushed stone)
- Earthing and lightning protection materials
- Control, monitoring, and SCADA system components
- Fire-fighting and safety equipment

Construction Phase

The construction phase of the Kazungula Solar Photovoltaic (PV) Project will involve the installation of solar PV modules on mounting structures, inverters, transformers, switchgear, and associated electrical and civil infrastructure, including internal access roads, fencing, and the operations and maintenance building, as well as the development of the 1.5 km transmission line connecting the plant to the Kazungula ZESCO Substation. All activities will be carried out in accordance with approved designs, health and safety standards, and the Environmental and Social Management Plan (ESMP), with measures in place to control dust, noise, waste, and other environmental impacts, while prioritising the use of local labour and suppliers where feasible.

Operation Phase

During the operation phase, the Kazungula Solar Photovoltaic (PV) Project will generate electricity by converting sunlight into direct current (DC) through the PV modules, which will then be transformed into alternating current (AC) via inverters for evacuation to the national grid through the Kazungula ZESCO Substation. Routine activities will include monitoring and maintenance of PV modules, inverters, transformers, electrical connections, and other balance-of-plant equipment to ensure optimal performance and safety. The site will be managed to minimise environmental impacts, including controlling dust, maintaining vegetation, managing stormwater, and safely handling waste and hazardous materials. Operational procedures will adhere to health, safety, and environmental standards, with staff trained in emergency response and plant safety, ensuring the facility provides reliable, low-carbon electricity while sustaining positive socio-economic benefits for the local community.

Project Schedule

The schedule for the proposed works is as shown below:

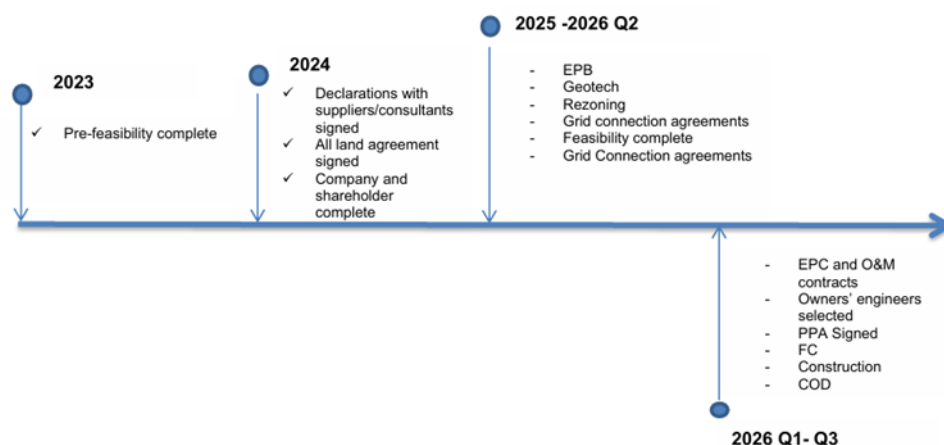


Figure 3-3: project time frame

3.3.2 Water

Water requirements for the Kazungula Solar Photovoltaic (PV) Project will be relatively low and mainly associated with construction and operational activities. During the construction phase, water will be used for dust suppression, concrete works, and general site activities, while during the operation phase, limited quantities of

water will be required for periodic cleaning of solar PV modules and for domestic use at the operations and maintenance facility.

Water will be sourced from approved and lawful sources in accordance with the Water Resources Management Act and any applicable permits from the Water Resources Management Authority (WARMA). Efficient water-use practices will be implemented to minimise consumption, including controlled water application for dust suppression and scheduled panel cleaning based on actual soiling levels. Measures will be put in place to prevent contamination of surface and groundwater, ensuring that water use does not adversely affect local water resources or surrounding communities.

3.3.3 Social aspects

The proposed project is expected to have generally positive social impacts through the creation of employment opportunities for local community members during both the construction and operation phases, thereby contributing to income generation and improved livelihoods. The project will support skills development through on-the-job training, particularly in technical, operational, and safety-related aspects, while also stimulating the local economy through procurement of goods and services. Potential adverse social impacts, such as temporary population influx, pressure on local services, and occupational health and safety risks, will be minimised through the implementation of appropriate mitigation measures, including compliance with labour laws, occupational health and safety standards, and ongoing stakeholder engagement to ensure community concerns are identified and addressed throughout the project lifecycle.

3.3.4 Waste Management

Waste generated during the construction, operation, and decommissioning phases of the project will be managed in accordance with the Environmental Management Act and applicable waste management regulations. During construction, wastes are expected to include vegetation from site clearing, packaging materials, scrap metal, concrete residues, and general domestic waste from the workforce. Operational phase wastes will mainly comprise minor quantities of general office waste, damaged or replaced PV modules, electrical components, and maintenance-related materials. The project proponent will implement a Waste Management Plan that prioritises waste minimisation, segregation at source, reuse and recycling where feasible, and safe collection, storage, and disposal through licensed waste handlers and approved disposal facilities. Hazardous wastes, if generated, will be handled and disposed of in accordance with statutory requirements to prevent environmental contamination and risks to human health.

3.3.5 Chemical

Chemical Application

The project will require limited use of chemicals, mainly during the construction and operation phases. During construction, chemicals may include fuels, lubricants, oils, hydraulic fluids, and small quantities of concrete additives and cleaning agents used for equipment operation and maintenance. During the operational phase, chemical use will be minimal and largely restricted to lubricants, transformer oils, and cleaning agents for PV modules and electrical equipment. All chemicals will be stored, handled, and used in accordance with manufacturer specifications and relevant Zambian regulations, with appropriate secondary containment measures in place to prevent spills and soil or water contamination. A spill prevention and response procedure will be implemented, and personnel will be trained in safe chemical handling, storage, and emergency response to minimise risks to the environment and human health.

4 ANALYSIS OF ALTERNATIVES

The proposed Solar PV Project in Kazungula District has been designed with due consideration of feasible alternatives that could achieve the overall objective of increasing reliable and sustainable electricity generation from renewable energy sources. In line with environmental best practice and regulatory requirements, the analysis of alternatives evaluates different options related to project location, technology selection, design configuration, and the “no-project” option, with the aim of identifying the most environmentally, socially, and economically viable approach. This assessment seeks to ensure that the selected project option optimizes power generation efficiency while minimizing potential adverse environmental and social impacts and complying with ZEMA requirements and applicable international environmental and social standards.

The following alternatives were considered based on the project activities of proposed development of the Solar PV Sites.

4.1 Project Site Location

There are other districts in Southern Province which could benefit from the proposed Solar PV project. The current location has been chosen as one of the priority districts preferred by VFU-CEL and other stakeholders.

Site Selection Alternatives

The alternatives for the site selection are:

Option A: Select an Alternative Site

This option would involve abandoning the proposed project site and identifying a new location not previously selected during stakeholder consultations. Such a change would require fresh feasibility studies, environmental assessments, engineering designs, and renewed stakeholder engagement. This would significantly increase project costs and extend implementation timelines. In addition, delays and additional financial requirements could affect the overall economic viability of the Project. For these reasons, this option is considered less favorable.

Option B: Implement the Project at the Proposed Site

Option B involves developing the Project at the currently proposed site. This site has already undergone preliminary technical assessments and engineering design works, and it has been identified as suitable through stakeholder consultations. Implementation at this location will facilitate the efficient delivery of reliable and sustainable electricity from renewable energy sources, while avoiding unnecessary delays and additional costs associated with relocation.

Preferred Option

Option B is the preferred alternative as it represents the most technically feasible, economically viable, and practically achievable option. Developing the Project at the proposed site allows for timely implementation and supports the objective of enhancing renewable energy generation in Kazungula District.

4.2 Raw material alternatives

The Developer considered two alternatives for sourcing raw materials during the construction phase: procurement from local suppliers or from external sources. Preference has been given to sourcing materials locally, where available, due to the associated positive direct, indirect, and multiplier effects. Local

procurement is expected to stimulate economic activity, support local businesses, create employment opportunities, and increase government revenue through taxes and related contributions. Materials to be sourced locally, where feasible, include river and building sand, cement, aggregates and crushed rock, steel products, roofing materials, paint, timber for shuttering, door and window frames, brickforce, and mesh reinforcement. Prioritizing local procurement will ensure that the economic benefits of the Project are maximized within the surrounding communities.

However, specialized materials and equipment that are not available locally will be procured from external sources. These may include electro-mechanical components and other specialized solar PV equipment that must be imported from international manufacturers due to the absence of locally available, cost-effective alternatives.

4.3 Design and technology Alternatives

4.3.1 Renewable energy technology alternatives

The proposed project considered different renewable energy producing processes including the Hydropower, wind power, solar power, and Biotechnology. Solar power alternative was evaluated and was selected because it offered the following advantages over Hydropower, wind power and Biotechnology:

- Zambia's solar power industry has proven exploitable potential, with high success rates due to reliable technology and successful SPPs
- Compared to hydropower, it is not dependent on water availability or rainfall patterns; unlike wind power, it is less affected by site-specific wind variability and mechanical wear from moving parts; and unlike biotechnology (biomass energy), it does not rely on continuous feedstock supply or produce combustion-related emissions. This makes solar power a reliable, low-maintenance, and clean energy option.
- Economically, SPPs are a competitive renewable source of energy. SPPs can easily be rehabilitated or upgraded especially when the recent advances in Solar technologies are utilised

4.3.2 Design Alternatives

Concentrated Solar Power (CSP)

Concentrated Solar Power (CSP) technology uses mirrors or lenses with solar tracking systems to concentrate direct sunlight to produce thermal energy, which is then converted into electricity. CSP systems require high levels of direct normal irradiance, large contiguous land areas (typically 5–10 acres per megawatt), and significant water resources for cooling and cleaning. They are also mechanically complex and maintenance-intensive. Given these technical, environmental, and operational requirements, CSP was considered less suitable for the proposed project.

Fixed-Tilt Solar PV System

The fixed-tilt PV option involves mounting solar modules at a constant angle optimized for annual solar energy capture based on site latitude. This design is characterized by lower capital costs, mechanical simplicity, minimal maintenance requirements, and reduced water demand. Fixed-tilt systems also result in relatively lower land disturbance, making them a cost-effective and reliable option for long-term operation.

Single-Axis Tracking Solar PV System

The single-axis tracking system allows solar modules to rotate along one axis, typically following the sun's east-to-west movement. This increases energy yield compared to fixed-tilt systems and improves overall efficiency. However, it involves higher capital investment, greater mechanical complexity, increased maintenance requirements, and slightly higher land use. These trade-offs were carefully evaluated in determining the most appropriate design for the Project.

Preferred Technology: Solar Photovoltaic (PV) System

Solar photovoltaic (PV) technology converts sunlight directly into electricity using semiconductor-based solar modules. PV systems are reliable, require relatively modest land area, involve minimal water use, and have comparatively low operation and maintenance costs. Considering site conditions, cost efficiency, operational simplicity, and available grid infrastructure, PV technology was identified as the most suitable option for the proposed development.

4.3.3 Alternative Source of Energy

In addition to the proposed solar photovoltaic (PV) technology, alternative energy sources were considered as part of the project options analysis. These included hydropower, thermal power generation using fossil fuels, and other renewable sources such as wind and biomass. Hydropower, while a major contributor to Zambia's energy mix, is increasingly vulnerable to climate variability and prolonged droughts, which have resulted in reduced generation capacity and supply instability. Fossil fuel-based thermal generation was considered unsuitable due to its high greenhouse gas emissions, fuel cost volatility, and inconsistency with national and global climate change mitigation objectives. Wind and biomass energy options were also reviewed; however, wind resources in the project area are not sufficiently proven at utility scale, while biomass generation would require sustained feedstock supply and could place pressure on land and natural resources. Consequently, solar PV was identified as the most appropriate and sustainable alternative energy source for the project, given the area's favorable solar resource, low environmental footprint, and alignment with Zambia's renewable energy and climate policy objectives.

5 DESCRIPTION OF BASELINE ENVIRONMENT

5.1.1 Physical Environment

5.1.2 Climate

Kazungula District lies within the semi-tropical climatic zone and experiences a well-defined seasonal pattern marked by three distinct seasons. The cool and dry season occurs from April to August and is characterized by lower temperatures, reduced humidity, and minimal rainfall. This is followed by the hot and dry season from September to November, during which temperatures rise significantly and conditions become increasingly arid prior to the onset of the rains. The warm and wet rainy season extends from November to March and is dominated by higher humidity levels and substantial rainfall, which supports vegetation growth but may also influence surface runoff, soil erosion, and water availability within the district.

5.1.2.1 Temperature

Average monthly temperatures range from as low as 17.7–17.8 °C in June and July to a peak of approximately 27.78 °C in October, reflecting cooler conditions during the mid-year dry season and progressively warmer conditions towards the end of the dry season. Temperatures begin to rise from August, reaching their maximum in October before gradually declining during the rainy season (Weather and Climate (Zambia)).

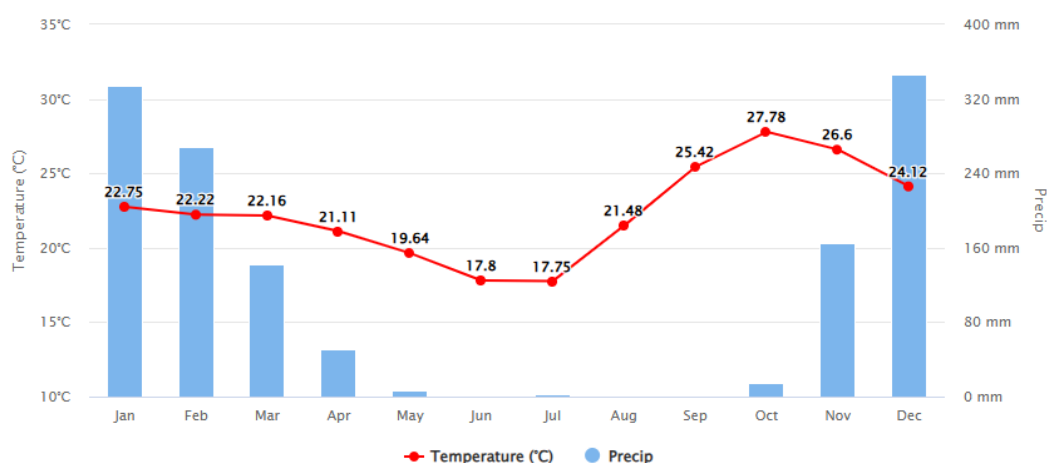


Figure 5-1: Maximum and Minimum Temperatures

5.1.2.2 Rainfall and Evaporation

Kazungula District experiences a distinct seasonal rainfall pattern, with the majority of precipitation occurring between November and March. Peak rainfall is recorded in December (approximately 330 mm) and January (about 310 mm), with a gradual decline from February (270 mm) to March (180 mm). Rainfall decreases significantly in April (about 120 mm) and becomes minimal to negligible from May to September, marking the dry season. Precipitation begins to increase again in October (approximately 20 mm), signalling the transition into the next rainy season as shown in figure 5-2 below.

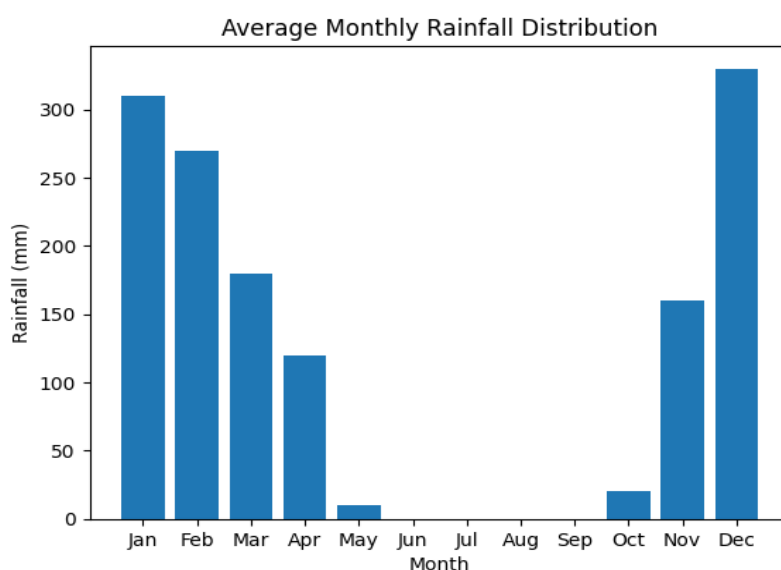


Figure 5-2: Year monthly rainfall
Source: Weather and Climate (Zambia)

5.1.2.3 Relative Humidity, Sunshine and Wind

Relative humidity in Kazungula District varies seasonally in response to rainfall patterns and temperature fluctuations. During the rainy season (November to March), humidity levels are generally high due to increased precipitation and cloud cover, while lower humidity is experienced during the dry season, particularly between May and September. Wind conditions in the district are generally moderate, with higher wind speeds often recorded during the dry season due to enhanced atmospheric pressure gradients.

5.1.3 Air Quality and Noise

The air within the project site is clean. There are currently no major industrial activities that could cause the air to be polluted. The air quality is somehow good though it is sometimes compromised by the emissions from motor traffic and fumes from vehicles along the Kazungula Mwandu Road and the Kazungula to Zimbabwe and Botswana Road. The noise status in the area is shown in Table 5-1 and Figure 5-3 shows the points where noise was measured.

Table 5-1: Noise status in the area

Noise Measurements in Decibels (dB)			
S/N	POINT 1 17.760175 S 025.278121 E	POINT 2 17.753479 S 025.274770 E	POINT 3 17.764688 S 025.276291 E
1	37.3	46.2	76.9
2	34.6	46.6	43.1
3	35.5	39.5	40.3
4	36.3	48.1	43.8
5	33.7	40.5	78.4
6	35.3	46.9	82.0
7	36.1	39.8	51.2

8	41.4	45.3	53.8
9	37.0	42.2	75.8
10	37.0	45.6	77.2
Mean	36.4	43.8	62.3
Standard Deviation	2.1	3.3	17.2

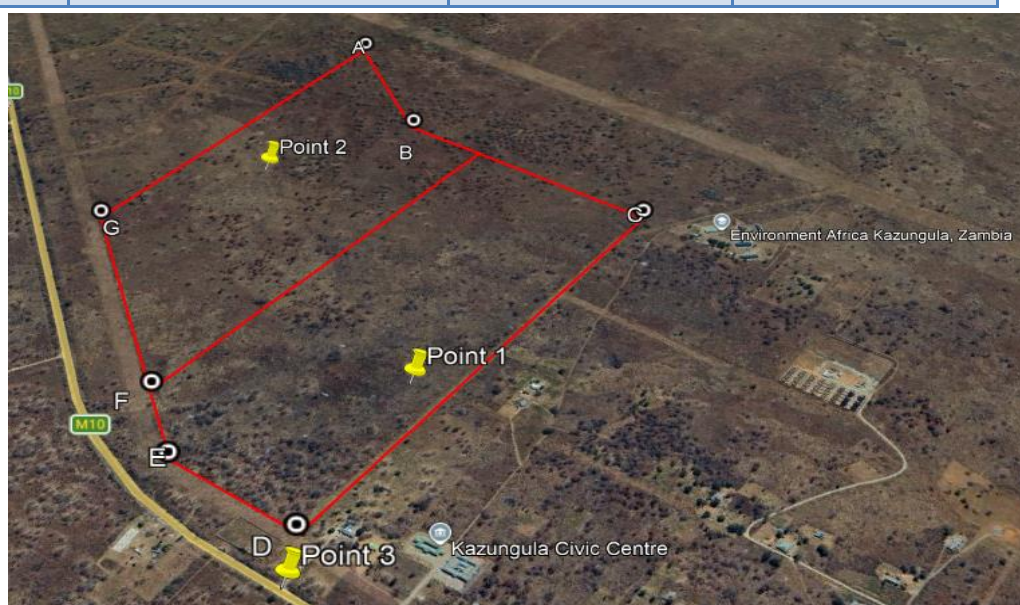


Figure 5-3: Points where noise was measured

5.1.4 Geology and Topography

The project area is predominantly underlain by geological formations of the Karoo Supergroup. The primary geological units identified include basement basalt, alluvial deposits (comprising gravels and sand) along the river course, and the Kalahari Series, characterized by sand and silt layers.

Basalt is the dominant rock type within this Supergroup, although sandstone occurrences are also noted. The basalt formation underlies the alluvial sediments of the Zambezi River, forming its foundational bed. This basalt is typically fractured and exhibits minor weathering, with calcite deposition present in larger fractures.

Beyond the river channel and floodplain, the basalt is overlain by the Kalahari Series, which consists mainly of unconsolidated sands and silts interspersed with calcrete layers. The series generally contains a high silt content, which significantly limits its permeability.

According to Bäümle et al (2007a), the Southern Province is dominated by three topographic features: the Choma-Kalomo Block in the centre of the province; the escarpment and the Zambezi valley ("graben") in the east and the Kafue Flats in the north. The altitude within the province rises from approximately 400m in the Zambezi valley to almost 1,400m on the central plateau.

Generally, the relief of the project area is described as a plateau with an altitude ranging from 969.1 to 977.5 meters above sea level (masl). The project site has a gentle gradient dipping in a southwesterly direction.

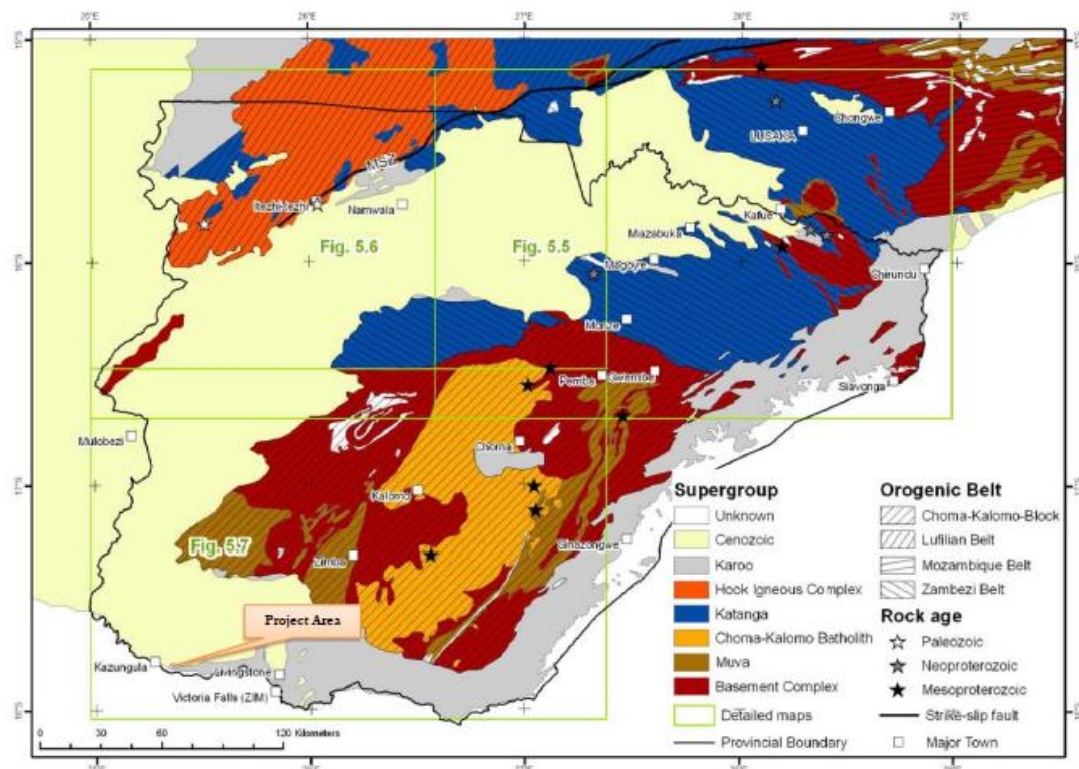


Figure 5-4: The geology of Zambia

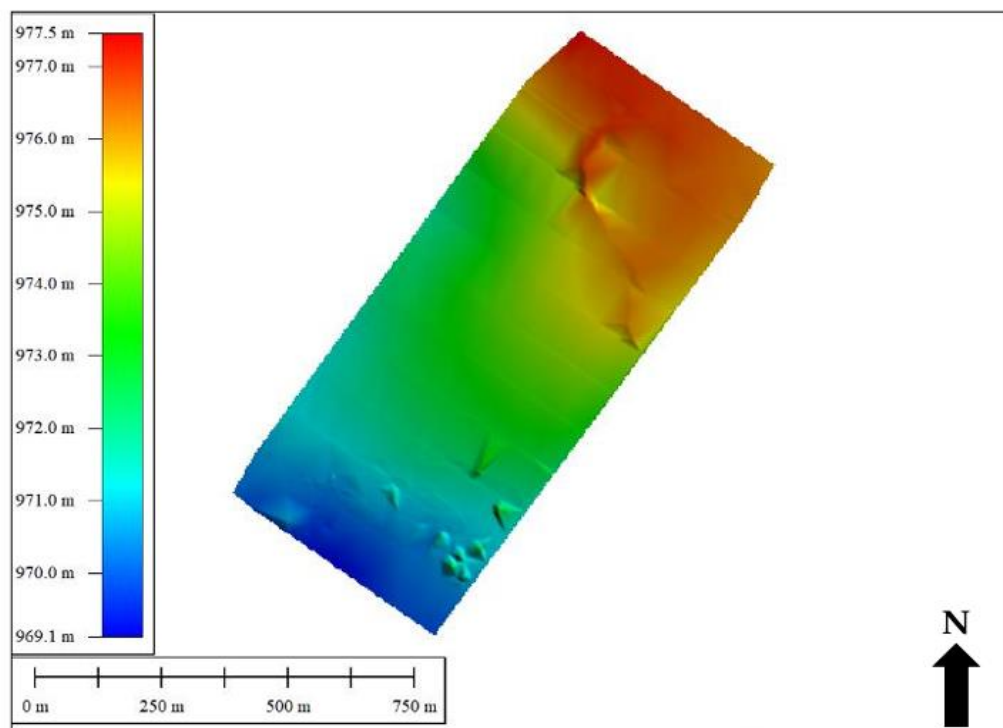


Figure 5-5: Topography of the Project Area

5.1.5 Hydrology

The Zambezi River, situated southwest of Kazungula Town and approximately 3.75 km southwest of the project location, serves as a primary water source for local residents. The current abstraction works in

Kazungula Town are located just downstream of the confluence of the Chobe and Zambezi Rivers, while the proposed abstraction works are planned upstream of the confluence. According to the Zambezi River Authority (ZRA), the nearest flow measurement station is at Nana's Farm, approximately 45 km from Kazungula Town, where a flow rate of 1,181 m³/s was recorded in February 2021. Consequently, the river flow at Kazungula Town can be assumed to be comparable to that observed at Nana's Farm.

5.2 Biological Environment

The project will be implemented in Kazungula District which boasts a diverse biological environment, rich in both flora and fauna.

5.2.1 Methodology

The qualitative and quantitative method of analysis were adopted with the team's professional and profound experience; the data collection and analysis are very credible. Portable instruments such as tally counters, note pads were used for assessing the socio-economic characteristics of the local population, while other specialized instruments such as handheld GPS, diameter tape, callipers, sunto, levels, steel tapes, pH meters, bark-gauge, flora-fauna atlases and computer software packages were used during specialized data collection. In flora and fauna assessments, the following principles were followed as established by Nune (2008):

5.2.2 Flora data collect methods

The site was traversed so as to understand and identify flora species present in the area. Flora assessment was conducted following the relevant ecological assessment guidelines. Ten (10) Circular plots of 20 m radius were systematically established at a minimum distance of 100 m apart and we ensured that each habitat type identified was represented and sample. The first sampling point was selected at random and the remaining points were set in relation to the first point.

Individual plants in the plots were observed in order to get information on the composition of the vegetation and the quality of the vegetation in the area in terms of:

- Size of individuals;
- Structure of the vegetation;
- Relative number of individuals;
- Species composition

Plant species were, as far as possible, identified in the field using tree identification field guides by Palgrave 1977, Storrs 1995, and Van Wyk and Van Wyk 2013. However, when identification was doubtful, specimens were collected for confirmation of identity in the herbarium.

5.2.2.1 Flora

5.2.2.1.1 Objectives of flora assessment

To identify the botanical attributes of the site where the project will take place including:

- Description of the extent and types of native vegetation present.
- Compilation of species lists of all observed indigenous plants (both aquatic and terrestrial).
- Compilation of species list of all observed non-native plants found in the area.
- Identification of the presence or absence of threatened plant species or vegetation communities.
- Compilation of a list of plant species under the IUCN Red List (if present).
- To quantify the regeneration status of the area.



Figure 5-6: Flora data collection

5.2.2.1.2 Flora data analysis

Abundance, Relative Frequency (RF), Relative Density (RD), Relative Basal Area (RBA) and Important Values (IV)

Excel will be used to analyze the data on flora. The species data will be used to determine species importance values (IV) and species richness. Importance values were calculated as adopted from DWAF (2005). Species important values are very important in determining the performance of the species in a given area.

For plants with dbh ≥ 5 cm

$$IV = \frac{[\text{Relative Frequency (RF)} + \text{Relative Density (RD)} + \text{Relative Basal Area (RBA)}]}{3}$$

$$RF = \frac{\text{Number of plots in which species is present}}{\text{Total Number of plots recorded}} \times 100$$

$$RD = \frac{\text{Number of stems recorded for species}}{\text{Number of stems recorded for all species}} \times 100$$

$$\text{Abundance} = \frac{\text{Total number of stems recorded for species}}{\text{Total number of quadrants in which the species occurred}}$$

$$RBA = \frac{\text{Basal area of a species in a community}}{\text{Total basal area of all species in the community}} \times 100$$

- Calculation of dominance

Indices

Dominance indices are weighted towards the abundance of the commonest species. Dominance indices were calculated for the commonest species. The dominance indices that were used included the following:

Information-statistic indices

- Species Richness

Where: S = Number of species observed in the

N = Total number of individuals trees Observed

b. Shannon Index (Hs)

$$H_s = -\sum p_i \ln p_i$$

Where: P_i = Proportion of individuals found in the i th species and

$\ln$ = Natural logarithm

5.2.2.1.3 Purpose of flora assessment:

To identify the botanical attributes of the assessment site, including:

- Compilation of species lists of all observed flora
- Mapping and describing the extent and type of native vegetation present
- The presence or absence of threatened species or communities
- High conservation value areas

To quantify the botanical attributes of the assessment site (if necessary), to:

- Identify the species and size class of scattered trees found within the site, and determine the ecological/habitat significance of each
- Map the locations of threatened flora species (if present), and indicate potential habitat for threatened species
- Refine suggested future flora surveys (using the assessment results)

Undertake a habitat hectare assessment of patches of native vegetation of differing quality and/or Ecological Vegetation Classes.

5.2.3 Findings

5.2.3.1 Vegetation and Flora - General context

Generally, Kazungula Town is characterised by Zambezian and Mopane Woodlands. The vegetation of Kazungula Town has undergone high human influence due to timber harvesting and charcoal burning. The degradation of the vegetation has led to the Malanda protected forest area being mostly characterised by shrubs and bushes. The District Forestry Officer indicated that the area has undergone about 85% human influence. The situation may lead to desertification of Kazungula if the deforestation rate is not controlled.

Vegetation types generally show a marked correspondence to the geological formations found in the Kazungula Town. Mukwa, the Blood wood (*Pterocarpus angolensis*), Mkusi, the Zambian Teak (*Baikiaea plirijuga*) and Mungongo, the False balsa (*Ricinodendron rautanenii*), are the most common species found in Kazungula District. Miombo (open deciduous woodland), Musibi (Rosewood) and Mopane can occasionally be found in the high and low-lying areas, respectively.

UNEP (2013) provides a map showing the vegetation types for the Southern Province where the project area lies (**Error! Reference source not found.**).

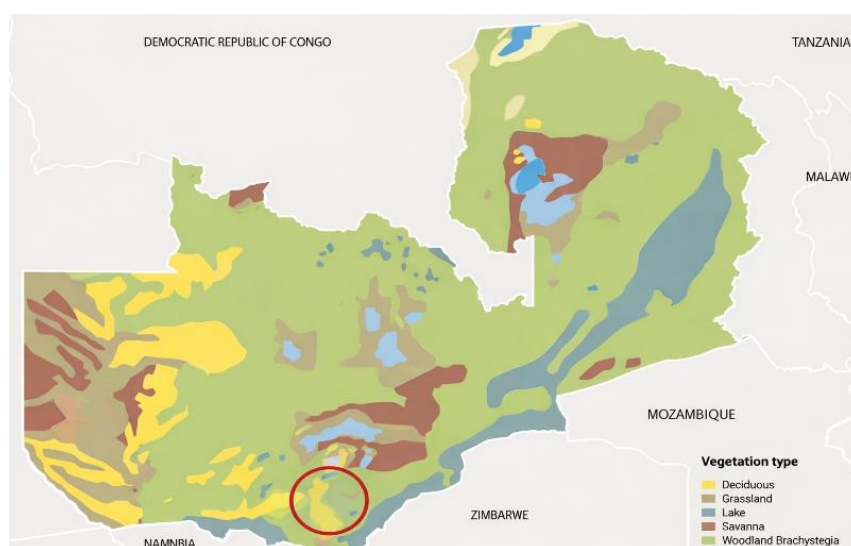


Figure 5-7: Vegetation map extract from the UNEP Atlas of Zambia

Source: UNEP, 2013

According to the Kazungula District Profile, the vegetation found in Kazungula District ranges from Savannah grasslands to Miombo woodlands. However, within Kazungula Town, the absence of *Brachystegia* and *Julbernardia* tree species, which characterise Miombo woodlands, was observed. The Kazungula urban and the immediate peri-urban area seemed to be characterised mostly by Mungongo and Mopane tree species. This signifies that Kazungula Town falls in the Zambezian and Mopane woodlands. The nearest statutory protected areas are Malanda Forest No. 20 and Katombora Forest No. 20 located some 9km and 10.4km from Kazungula Town respectively.

The surrounding vegetation is largely composed of secondary growth shrubs and regenerating woodland, reflecting extensive historical and ongoing anthropogenic disturbances. These disturbances include timber harvesting for construction materials, fuelwood collection, and widespread charcoal production, which have significantly altered the original woodland structure and composition. As a result, much of the natural vegetation exhibits signs of degradation such as reduced canopy cover, uneven age distribution of trees, coppicing, and increased dominance of shrub species and pioneer plants. The project area, including the adjacent Protected Forest, has experienced a high level of human influence estimated at approximately 85%. This level of disturbance indicates substantial modification of the natural habitat through resource extraction, charcoal production and informal access routes. Only a small portion of the project footprint remains near-intact, retaining relatively mature woodland structure and higher ecological integrity. These less disturbed patches may provide important habitat functions, including refuge for local fauna, seed banks for natural regeneration, and ecosystem services such as soil stabilization and carbon storage. Overall, the baseline ecological condition of the site can therefore be described as moderately to highly disturbed woodland, with limited areas of intact vegetation that may warrant particular consideration during project planning and implementation.

5.2.3.2 Vegetation and flora in the Project Area

The vegetation is predominantly Mongongo (*Ricinodendron rautanenii*), with localized occurrences of Mopane. Vegetation growth and structure are significantly retarded by recurrent annual clearing for agricultural activities and charcoal production. Consequently, the area is dominated by secondary

regeneration, with forest stands rarely reaching full maturity, and large portions of the landscape presenting as open grassland.



Figure 5-8: Some vegetation within the project area



Figure 5-9: Mongongo (*Ricinodendron rautanenii*), Species in the Project Area

The species identified in the project area during the flora survey area shown in Table 5-2.

Table 5-2: Species in the Project Area

NO.	Local Name	Common Name	Scientific Name	Stems	Plots	Av. Diam
1	Muzwili (L)	Lead wood	<i>Combretum imberbe</i>	30	8	15
2	Mulombe (L)	Blood wood	<i>Pterocarpus angolensis</i>	2	2	10
3	Mukenge (L)	Large-fruited bushwillow	<i>Combretum zeyheri</i>	8	5	15
4	Mukusi (L)	Red wood, Zambian Teak	<i>Baikiaea plurijuga</i>	43	16	30
5	Mungongo (LU)	False Balsa	<i>Ricinodendron rautanenii</i>	59	18	70
6	Muchingachinga (T)	Monkey fingers	<i>Friesodielsia obovata</i>	53	15	30
7	Mupondopondo (L)	Zambezi coffee, White bauhinia	<i>Bauhinia petersiana</i>	39	14	25
8	Munga (L)	Camel Thorn	<i>Acacia erioloba</i>	8	5	12



Figure 5-10: Forest Transition in the area

Table 5-3: Local uses of terrestrial and riparian tree species of Kazungula Town

Local Name	Common Name	Scientific Name	Use
Muzwili (L)	Lead wood	<i>Combretum imberbe</i>	- For making Mortars for pounding, - Curios such as plates, wildlife and ordinary stools - Charcoal
Mulombe (L)	Blood wood	<i>Pterocarpus angolensis</i>	For Timber
Mukenge (L)	Large-fruited bushwillow	<i>Combretum zeyheri</i>	- For charcoal - Leaves for treating stomachache
Mukusi (L)	Red wood, Zambian Teak	<i>Baikiaea plurijuga</i>	- For Timber and Charcoal; the current source of Charcoal in Kazungula Town - Making Canoes - For Firewood Mubita (L, T) Rough-leaved shepherds' tree <i>Boscia angustifolia</i>
Mungongo (LU)	False Balsa	<i>Ricinodendron rautanenii</i>	- Edible seed pulp and oil; seed cake used as stock feed - Making Canoes, stools and chairs
Muchingachinga (T)	Monkey fingers	<i>Friesodielsia obovata</i>	Edible fruits
Mupondopondo (L)	Zambezi coffee, White bauhinia	<i>Bauhinia petersiana</i>	

5.2.3.3 Fauna - General context

All wildlife in Zambia is protected under the Zambia Wildlife Act No. 14 of 2015. In this context, wildlife is defined as all wild animals or species of birds which are found in Zambia in a wild state and vegetation which is indigenous to Zambia and grows naturally without cultivation. Thus, conservation and protection of species is assigned based on the provisions of this Act. However, specific national conservation action plans / programmes exist for several highly threatened species, including the elephant, wild dog, rhinoceros, tortoise, snouted crocodile and lion.

Terrestrial fauna in the Project Area was characterised based on the main habitats occurring in the region, the existing literature and field investigations conducted by the Consultant.

5.2.4 Fauna in the Project Area

Terrestrial fauna habitats in the project area is characterised mostly by Mungongo, Mopane tree species and grassland. There is absence of *Brachystegia* and *Julbernardia* species, signifying that the project area falls in the Zambezian and Mopane woodlands biome. Occurring habitat types were defined based on the findings from the vegetation investigations, as well as the existing literature (Ansell 1978; Sinclair and Ryan 2010; Schmidt 2006).

To further characterise these habitats and the species they are likely to harbour, the Consultant conducted field investigations in January 2026. In addition to interviews with people familiar with the local fauna, a variety of field investigation techniques were employed, including ground transects and trap lines. These were set in different areas representing the major habitat types.

Transects were set up in each habitat and rocks and litter turned over in search of terrestrial macroinvertebrates, amphibians and reptiles. All species encountered were identified based on morphological features using field guides (Schmidt 2006; Schiotz 1999; Weaving 2000).

To survey small mammals, standard Sherman traps were placed every five meters on the ground along 60 m transects. The traps were exposed for 24 hours at each site and checked every morning. All were baited with oats and peanut butter. All specimens trapped were identified based on their morphological features (Kingdon 1997, Kingdon et al. 2013) and assigned to their habitats of occurrence. Ground transects were traversed on foot and road in search of signs and presence of large mammals in the major habitat types.

For birds, point transects were established and observations were made from 15:00 - 17:00 hrs. Birds were identified based on their morphological features described by Sinclair et al. (2002) and Sinclair and Ryan (2010).

Interviews with selected local community members who are familiar with the local fauna were conducted, with the aim of identifying species occurrences that the aforementioned methods did not cover sufficiently. In addition, relevant literature was reviewed (Ansell 1978; Schiotz 1999; Pinhey 1973; Schmidt 2006) to account for species occurrence.

5.2.4.1 Mammals

The project area falls within a site with a richness of mammals such as *Cercopithecus aethiops* (Vervet monkey) to mention but a few. In addition, the project area falls within an elephant corridor.

5.2.4.2 Avifauna

For birds, point transects were established and observations were made in the morning and afternoon. Birds were identified based on their morphological features described by Sinclair et al. (2002) and Sinclair and Ryan (2010). The identified bird species are shown in Table 5-4. There were 86 bird species observed in the project area. The most abundant is *Cisticola juncidis* (Fan-Tailed Cisticola).

Over 750 bird species are found in Zambia. There are 3 breeding endemic species and 16 species considered to be globally threatened that can be found in Zambia (www.birdlife.org/datazone). The list presented in Table 5-4 shows the diversity of avifauna that was observed and heard and includes bird species that have been seen by the local people who were interviewed during the survey period.

Table 5-4: List of birds observed and sounds heard in the area

No	Scientific name	Common name	Status
1.	<i>Muscicapa striata</i>	Spotted Flycatcher	LC
2.	<i>Bucorvus leadbeateri</i>	Southern Ground Hornbill	LC
3.	<i>Lybius torquatus</i>	Black-collard Barbet	LC
4.	<i>Pogoniulus chrysoconus</i>	Yellow-fronted Tinkerbird	LC
5.	<i>Dendropicos namaquus</i>	Bearded Woodpecker	LC
6.	<i>Mirafra rufocinnamomea</i>	Flappet Lark	LC
7.	<i>Hirundo rustica</i>	European Swallow	LC
8.	<i>Oriolus larvatus</i>	Black-headed Oriole	LC
9.	<i>Corvus albus</i>	Pied Crow	LC
10.	<i>Turdoides jardineii</i>	Arrow-marked Babbler	LC
11.	<i>Phyllastrephus terrestris</i>	Terrestrial Brownbul	LC
12.	<i>Cossypha heuglini</i>	Heuglin's Robin-Chat (White-Browed Robin-Chat)	LC
13.	<i>Sylvia borin</i>	Garden Warbler	LC
14.	<i>Cisticola juncidis</i>	Zitting (Fan-tailed) Cisticola	LC

No	Scientific name	Common name	Status
15.	<i>Terpsiphone viridis</i>	African Paradise-Flycatcher	LC
16.	<i>Lanius collaris</i>	Common Fiscal Shrike	LC
17.	<i>Laniarius aethiopicus</i>	Tropical Boubou	LC
18.	<i>Dryoscopus cubla</i>	Black-backed Puffback Shrike	LC
19.	<i>Cinnyricinclus leucogaster</i>	Violet-Backed (Plum-coloured) Starling	LC
20.	<i>Zosterops senegalensis</i>	African Yellow White-Eye	LC
21.	<i>Cinnyris venustus</i>	Variable (Yellow-Bellied) Sunbird	LC
22.	<i>Cinnyris talatala</i>	White-Bellied Sunbird	LC
23.	<i>Cinnyris cupreus</i>	Copper (Coppery) Sunbird	LC
24.	<i>Cinnyris manoensis</i>	Miombo Double-Collared Sunbird	LC
25.	<i>Chalcomitra amethystina</i>	Amethyst (Black) Sunbird	LC
26.	<i>Chalcomitra senegalensis</i>	Scarlet-Chested Sunbird	LC
27.	<i>Anthreptes longuemarei</i>	Western Violet-Backed Sunbird	LC
28.	<i>Ploceus bicolor</i>	Forest weaver	LC
29.	<i>Ploceus cucullatus</i>	Village (Spotted-Backed) Weaver	LC
30.	<i>Anaplectes melanotis</i>	Red-headed weaver	LC
31.	<i>Ploceus velatus</i>	Masked Weaver	LC
32.	<i>Centropus senegalensis</i>	Senegal Coucal	LC
33.	<i>Quelea</i>	Red-billed Quelea	LC
34.	<i>Euplectes orix</i>	Southern Red-bishop	LC
35.	<i>Euplectes afer</i>	Yellow-Crowned (Golden) bishop	LC
36.	<i>Euplectes capensis</i>	Yellow Bishop (Cape/Yellow-Rumped widow)	LC
37.	<i>Spermestes cucullata</i>	Bronze Mannikin	LC
38.	<i>Uraeginthus angolensis</i>	Blue Waxbill	LC
39.	<i>Estrilda astrild</i>	Common Waxbill	LC
40.	<i>Vidua macroura</i>	Pin-tailed Whydah	LC
41.	<i>Urocolius indicus</i>	Red-faced Mousebird	LC
42.	<i>Colius striatus</i>	Speckled Mousebird	LC
43.	<i>Halcyon senegalensis</i>	Woodland Kingfisher	LC
44.	<i>Halcyon albiventris</i>	Brown-headed Kingfisher	LC
45.	<i>Halcyon chelicuti</i>	Striped kingfisher	LC
46.	<i>Streptopelia decipiens</i>	African Mourning Dove	LC
47.	<i>Pycnonotus tricolor</i>	Dark-Capped (Black- Eyed) Bulbul	LC
48.	<i>Streptopelia semitorquata</i>	Red-Eyed Dove	LC
49.	<i>Streptopelia capicola</i>	Cape Turtle (Ring-Necked) Dove	LC
50.	<i>Turtur chalcospilos</i>	Emerald-Spotted Wood-Dove	LC
51.	<i>Oena capensis</i>	Namaqua Dove	LC
52.	<i>Treron calvus</i>	African Green Pigeon	LC
53.	<i>Bubulcus ibis</i>	Cattle Egret	LC
54.	<i>Poicephalus suahelicus</i>	Grey-Headed Parrot	LC
55.	<i>Poicephalus meyeri</i>	Meyer's (Brown) Parrot	LC
56.	<i>Macrodipteryx vexillarius</i>	Pennant-Winged Nightjar	LC
57.	<i>Merops pusillus</i>	Little Bee-Eater	LC
58.	<i>Coracias caudatus</i>	Lilac-Breasted Roller	LC
59.	<i>Halcyon leucocephala</i>	Grey-Headed Kingfisher	LC
60.	<i>Dicrurus adsimilis</i>	Fork-Tailed Drongo	LC
61.	<i>Muscicapa adusta</i>	African Dusky Flycatcher	LC
62.	<i>Nilaus afer</i>	Brubru	LC
63.	<i>Sylvietta rufescens</i>	Long-Billed Crombec	LC
64.	<i>Camaroptera brevicaudata</i>	Grey-Backed Camaroptera	LC
65.	<i>Tauraco schalowi</i>	Schalow's Turaco	LC
66.	<i>Prinia subflava</i>	Tawny-Flanked Prinia	LC
67.	<i>Coturnix delegorguei</i>	Harlequin Quail	LC
68.	<i>Emberiza cabanisi</i>	Cabanis's Bunting	LC
69.	<i>Dendropicos griseocephalus</i>	Olive Woodpecker	LC

No	Scientific name	Common name	Status
70.	<i>Dendropicos fuscescens</i>	Cardinal Woodpecker	LC
71.	<i>Gallinula chloropus</i>	Common Moorhen	LC
72.	<i>Amauornis flavirostra</i>	Black Crake	LC
73.	<i>Elanus caeruleus</i>	Black-winged Kite	LC
74.	<i>Pytilia afra</i>	Orange-Winged (Golden-Backed) Pytilia	LC
75.	<i>Lagonosticta nitidula</i>	Brown Firefinch	LC
76.	<i>Lagonosticta rubricata</i>	African (Blue-billed) Firefinch	LC
77.	<i>Actophilornis africanus</i>	African Jacana	LC
78.	<i>Cypsiurus parvus</i>	African Palm Swift	LC
79.	<i>Hirundo rustica</i>	Barn (European) Swallow	LC
80.	<i>Cercropis cucullata</i>	Greater Striped Swallow	LC
81.	<i>Cercropis abyssinica</i>	Lesser Striped Swallow	LC
82.	<i>Motacilla aguimp</i>	African Pied Wagtail	LC
83.	<i>Haliaeetus vocifer</i>	African Fish-Eagle	LC
84.	<i>Milvus migrans</i>	Black Kite	LC
85.	<i>Micronisus gabar</i>	Gabar Goshawk	LC
86.	<i>Ardea melanocephala</i>	Black-headed Heron	LC

No threatened bird species in the area was observed during the survey period. However, it is important to note that some globally threatened bird species that have been observed in Zambia can possibly be found in the project area even if they were not seen during the survey period. These include Slaty Egret (*Egretta vinaceigula*), Grey Crowned Crane (*Balearica regulorum*), Wattled Crane (*Bugeraus carunculata*), Lappet-faced Vulture (*Torgos tracheliotos*), Hooded Vulture (*Necrosyrtes monachus*), White-backed Vulture (*Gyps africanus*), Secretarybird (*Sagittarius serpentarius*), Martial Eagle (*Polemaetus bellicosus*), Madagascar Pond Heron (*Ardeola idea*), Bateleur (*Terathopius ecaudatus*), Lesser Flamingo (*Phoeniconaias minor*) and White-headed Vulture (*Trigonoceps occipitalis*). Some of the bird species observed in the area during the survey period are shown in Figure 5-11 below.



Figure 5-11: Bird observed in the around and within the project area

5.2.4.3 Reptiles

152 species of reptiles (lizards, snakes and tortoises) have been recorded in Zambia. There are no records of reptiles' endemic to Zambia. Nonetheless, the 2015 Fifth National Report for the United Nation Convention on Biological Diversity (CBD), the Ministry of Lands, Natural Resources and Environmental

Protection (MLNREP) reveals that there are 156 species of reptiles and 45 of them are considered rare as they have been recorded from only one locality (MLNREP 2015).

No reptiles were seen during the survey period. This should not mean that there are no reptiles in the area. Reptiles are such organisms that are difficult to spot in the field. Reptiles that can possibly be found in this area are majority of lizards, some tortoise, agamas, geckos, chameleons and skinks. The list of reptiles presented in Table 5-5 is derived from the interviews done with the local people for the frequently seen reptiles in the area.

Table 5-5: Reptiles that are frequently seen in the project area

NO.	SCIENTIFIC NAME	COMMON NAME	STATUS
1	<i>Acanthocercus atricollis</i>	Southern Tree (Black-necked) Agama	LC
2	<i>Bitis arietans</i>	African Puff-adder	LC
3	<i>Dendroaspis polylepis</i>	Black Mamba	LC
4	<i>Dispholidus typus</i>	Boomslang	LC
5	<i>Naja nigricollis nigricincta</i>	Black-necked Spitting Cobra	LC
6	<i>Natriciteres olivacea</i>	Olive Marsh Snake	LC
7	<i>Pelomedusa subrufa</i>	Marsh Terrapin	LC
8	<i>Python natalensis</i>	Southern African Python	VU
9	<i>Stigmochelys pardalis</i>	Leopard Tortoise	LC
10	<i>Varanus niloticus</i>	Nile Monitor lizard	LC

5.2.4.4 Fish and amphibians

At the time of the survey, no fish species was observed. However, 490 species of fish consisting of 24 families that have been recorded in Zambia (MLNREP 2015). The family Cyprinidae is the second largest group and has 82 species. Other economically important families are Mormyridae (20 species), Characidae (17 species), Bagridae (18 species), Clupeidae (5 species) and Clariidae (15 species). Based on the interviews with the local people, fish species that are caught in the area include Catfishes (Suborder: Siluroidei) which are locally known as “Mulonge” and species of the genus *Barbus* commonly known as Misenga.

During the sampling period no amphibians were observed. There are 74 species of amphibian that are found in Zambia and 13 species are rare as they have been recorded from one locality (MLNREP 2015). Only one species is known to be endemic to Zambia and Malawi with the possibility of the species to occur in Democratic Republic of Congo and eastern Angola. The endemic species is called *Hyperolius kachalolae* (Kachalola Reed Frog) and the Nyika Dwarf Frog (*Bufo nyikae*) due to its restricted range (found in Nyika plateau).

The fish species present in the rivers and other rivers within the project area include *Tilapia rendallii*, *Clarias ngamensis*, *Oreochromis machochir*, *Lucioides stappersii* and *Ctenopoma multispinis*. Data was on this species was collected through interviews with local people in the area.

5.2.4.5 Insects

Approximately 6,135 species of invertebrates occur in Zambia of which 69 species are endemic and 14 are threatened (MLNREP 2015). Some groups of insects were observed in the area. Some of these insects are of economic value to the local people who collect them for food. Insects that are beneficial to the local people include honey bees (*Apis mellifera*), termites (*Microtermes goliath*) and various species of grass hoppers and edible caterpillars. Table 5-8 lists insect species observed in the area. Other groups

of insects that can possibly be found in the area include spiders, mites, millipede, centipedes, worms and scorpions.



Figure 5-12: some of the insects observed in the project area

Table 5-6: Insect species observed in the project area

NO	SCIENTIFIC NAME	ORDER/FAMILY	COMMON NAME
1	<i>Apis mellifera</i>	Hymenoptera	Honey bee
2	<i>Microtermes goliath</i>	Isoptera	Termite
3	<i>Dorylus helveolus</i>	Formicidae	Ants
4	<i>Solenopsis spp.</i>	Formicidae	Red ants
5	<i>Belonogaster junceus</i>	Vespidae	Wasp
6	<i>Helicopris spp.</i>	Scarabaeidea	Dung beetle
7	<i>Anopheles spp.</i>	Culicidae	Mosquito
8	<i>Musca domestica</i>	Diptera	Housefly
9	<i>Brachytrypas membraneus</i>	Orthoptera	Giant cricket
10	<i>Cicadetta spp.</i>	Cicadidea	Cicada

5.2.4.6 Invertebrates

The assessment of the biodiversity and abundance of invertebrates was mainly characterized by the hand capturing method and use of areal nets during the walk in transect in the project area. Photos of seen invertebrates were taken and the number recorded. More than 8 species of invertebrates were observed in the area and some of these are shown in Table 5-9.

Table 5-7: Invertebrates observed in the area

Scientific Name	Common Name	Abundance	IUCN Status
<i>Theba piasana</i>	White garden snail	10	Threatened
<i>Anisoptera stalus</i>	Dragonfly	20	Threatened
<i>Caelifera</i>	Grasshopper	20	Least concern
<i>Eurema brigitta</i> ,	Butterflies	5	Least of concern
<i>Carabidea</i>	Beetles	10	Threatened
<i>Archispirostreptus gigas</i>	Millipedes	15	Least concern
<i>Carpenter vagus</i>	Black Carpenter ants	50	Vulnerable



Figure 5-13: A millipede (*Archispirostreptus gigas*) observed in the project area

5.3 Description of Socioeconomic Environment

5.3.1 Land Tenure and Land Use

Peri-urban areas are transitional zones between urban and rural areas with no particular distinction in boundary. Laquinta and Drescher (2000) consider a peri-urban area to be a non-smooth, multidimensional continuum, defined not by specific proximity to a city, but rather the intensification of life and activities in an area. As a result, it is very difficult to determine a fixed boundary between urban and rural. Zambia's peri-urban land largely sits at the interface of statutory and customary land tenure systems. The colonial legacy of the tenure system in Zambia, as in many sub-Saharan African countries, is a dual land tenure system comprising one-part statutory tenure and the other part customary tenure.

Statutory tenure is by way of leasehold without freehold and administered by government through the Ministry of Lands and Natural Resources (MLNR) and its agents (district/city councils), while customary tenure is governed by customary norms and administered by traditional leaders, through a chief and village headman structure that typically lacks formal documentation. The land where the solar plant will be installed is under state land belonging to Victoria Falls University of Technology.

5.3.2 Population

The population censuses which are conducted every ten years in Zambia are the major source of demographic information. According to the 2022 Census of Population and Housing, Zambia's population was 19,610,769 in 2022. Having increased from 13,092,666 in 2010. The population of Zambia more than quadrupled from 4,056,955 in 1969 to 19,610,769 in 2022.

The regional distribution of the population shows that 60% resided in rural areas and 40% in urban areas. In the same year, the population of the project catchment area was 19,610,769 of which 49% were male and 51% female.

The rural population grew at an average annual rate of 3.4 percent during the 2010-2022 period, an increase from 2.1 percent during the preceding intercensal period. Urban areas recorded a decline in the growth rate from 4.2 percent during the 2000-2010 intercensal period to 3.5 percent in the period 2010-2022.

Table 5-8: Population Growth Rate by District, Southern Province 2010-2022

Province	2010 Population			2022 Population			Average Annual Population Growth Rate 2010-2022		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Chikankata	29,696	30,213	59,909	48,719	49,952	98,671	4.2	4.3	4.2
Chirundu	23,096	24,248	47,344	38,215	40,565	78,780	4.3	4.4	4.3
Choma	88,340	92,333	180,673	129,035	137,881	266,916	3.2	3.4	3.3
Gwembe	25,908	27,209	53,117	38,841	40,432	79,273	3.4	3.4	3.4
Itezhi Tezhi	34,017	34,582	68,599	64,694	65,522	130,216	5.5	5.5	5.5
Kalomo	91,929	96,764	188,693	134,317	140,323	274,640	3.2	3.1	3.2
Kazungula	51,994	52,737	104,731	86,895	86,107	173,002	4.4	4.2	4.3
Livingstone	68,763	70,746	139,509	84,384	93,009	177,393	1.7	2.3	2.0
Mazabuka	85,087	85,976	171,063	113,214	118,831	232,045	2.4	2.7	2.6
Monze	93,958	97,914	191,872	130,412	138,020	268,432	2.8	2.9	2.8
Namwala	50,127	52,739	102,866	82,527	85,411	167,938	4.2	4.1	4.2
Pemba	32,349	34,838	67,187	48,950	52,071	101,021	3.5	3.4	3.5
Siavonga	21,348	21,521	42,869	32,701	33,329	66,030	3.6	3.7	3.7
Sinazongwe	49,209	52,408	101,617	78,251	80,804	159,055	3.9	3.7	3.8
Zimba	33,838	36,039	69,877	52,599	55,717	108,316	3.7	3.7	3.7
Total	779,659	810,267	1,589,926	1,163,754	1,217,974	2,381,728	3.4	3.5	3.4

In 2022, the national population density was 27.9 persons per square kilometre. This depicts an increase in the number of persons per square kilometre at national level from 17.4 in 2010. Lusaka Province was the most densely populated with the density of 140.1 persons per square kilometre. The second most densely populated province was Copperbelt with a density of 88.0 persons per square kilometre. Western Province has 10.8 persons per square kilometre and North Western Province was the least densely populated with 10.1 persons per square kilometre. Below are the districts in Southern Province. (Central Statistical Office (CSO), 2022).

Table 5-9: Population Density by District, Southern Province 2022

District Name	Population	Land Area	Population Density (Pop/ Land Area)
Chikankata	98,671	2,673.3	36.9
Chirundu	78,780	1,386.0	56.8
Choma	266,916	5,146.4	51.9
Gwembe	79,273	3,981.6	19.9
Itezhi Tezhi	130,216	15,790.8	8.2
Kalomo	274,640	8,381.6	32.8
Kazungula	173,002	18,055.6	9.6
Livingstone	177,393	689.5	257.3
Mazabuka	232,045	4,007.5	57.9
Monze	268,432	4,770.7	56.3
Namwala	167,938	5,678.4	29.6
Pemba	101,021	1,887.2	53.5
Siavonga	66,030	2,540.8	26.0
Sinazongwe	159,055	4,813.6	33.0
Zimba	108,316	5,480.1	19.8
Total	2,381,728	85,283.0	27.9

5.3.3 Administration

Kazungula Town Council functions under a tripartite administrative system, comprising the central government, the local authority (Town Council), and traditional governance structures, which collectively guide development planning, service delivery, and community affairs. The central government provides policy direction and oversight, while the Town Council is responsible for local administration, infrastructure management, and public service provision. Traditional authorities continue to play an important role in land allocation, dispute resolution, and maintaining cultural practices, particularly in peri-urban and rural areas surrounding the town.

Politically, Kazungula District is organized into a single constituency, Katombola, which is further subdivided into fourteen wards: Mandia, Sikaunzwe, Sekute, Ngwezi, Moomba, Musokotwane, Simango, Kanchele, Katapazi, Mukuni, Nyawa, Nguba, Kauwe, and Chooma. Each ward has representation in the Council and serves as a focal point for community engagement and local governance. The proposed project is planned for Mandia Ward, situated within Kazungula Town, where coordination among the central government, the Town Council, and traditional leaders will be essential to ensure effective implementation, compliance with regulations, and community participation.

5.3.4 Cultural and Social Set Up

Kazungula District is rich in cultural heritage, with traditional ceremonies playing a central role in preserving the district's cultural identity and promoting social cohesion. Notable among these is the Bene Mukuni Traditional Ceremony, led by Chief Mukuni Monokalya, which attracts both local and international visitors and contributes to cultural tourism. Another significant event is the Guta Mweenze Bbwe Traditional Ceremony.

Kazungula's strategic location has shaped its history and socio-cultural development, serving as a key crossing point and center for trade and migration over the centuries. The opening of the Kazungula Bridge in 2021, replacing the old ferry, has further enhanced the district's cultural and economic landscape. The Department of Community Services in Kazungula oversees public amenities that support education, culture, recreation, and youth empowerment, ensuring the continuation and promotion of cultural

traditions. Overall, Kazungula's cultural heritage reflects the enduring spirit of its people and highlights the importance of safeguarding and celebrating local customs and traditions.

Generally, the population in Kazungula are religious, the common religious denominations include the Seventh Day Adventists, Jehovah's Witnesses, United Church of Zambia, and Pentecostals.

5.3.5 Settlement Patterns and Housing

The project area has both urban and rural areas. In the urban areas located at the district headquarters, towns are planned and zoned into residential, commercial/offices and industrial areas. Dwelling houses are built in designated residential areas while commercial activities are restricted to the designated commercial centres which are referred to as Southern Business Districts (CBD) in the respective districts.

5.3.6 Economic Activity

Kazungula Town's status as a border town provides it with a strategic advantage for commerce and trade, contributing to economic development, poverty reduction, wealth creation, and job opportunities. This potential has been further enhanced by the opening of the Kazungula Bridge, which facilitates cross-border movement of goods and services. Local community members operate a variety of small businesses, including barbershops and salons, tailoring shops, internet cafés, grocery stores, carpentry workshops, and restaurants, primarily concentrated in local trading centres.

Agriculture remains a key source of income and livelihood in the Southern Province, with residents engaged in both crop farming and livestock rearing, including cattle, goats, pigs, chickens, and ducks. Fishing is also a significant economic activity, with fish caught in areas such as Mambova and subsequently transported to local markets for sale. Market vendors within Kazungula Town sell a variety of products, including vegetables, fruits, and forest resources, reflecting a mix of subsistence and commercial livelihoods. These diverse economic activities collectively support household income, improve food security, and foster broader socio-economic development within the town.

Charcoal production also constitutes an important livelihood activity for some households in and around Kazungula Town, particularly in peri-urban and rural areas. The activity is largely undertaken on a small-scale basis, providing a source of income for community members with limited access to formal employment. Charcoal produced in surrounding forested areas is transported to local trading centres and urban markets where it is sold to meet household energy needs, given the high reliance on biomass fuel for cooking.



Figure 5-14: Some of the economic activities in the area

5.3.7 Education and skills

Kazungula District is served by a total of 129 schools, comprising five community high schools, 78 primary schools, 41 community schools, four private schools, and one Government of the Republic of Zambia (GRZ) boarding secondary school. According to the District Education Board of Secretaries (DEBS), government schools accommodate 46,581 learners, supported by 781 teachers and an additional 341 voluntary teachers.

Within Kazungula Town, seven educational facilities were identified, including Kazungula High School, Riverview Primary and Secondary School, Lumbo Primary School, Kazungula Primary School, Dornaleo International School, Mamili Happy Horizon, and Thebe Academy. These institutions provide education across early childhood, primary, and secondary levels. Consultations with DEBS highlighted several challenges affecting education in the district, including long distances to schools, the limited capacity of secondary schools, and the absence of schools in certain zones. In 2020, 83 girls dropped out of school due to pregnancy, while 51 girls left school because of early marriages, underscoring the need for targeted interventions to improve retention and access to education.



Figure 5-15: Kazungula District Education Board Office

5.3.8 Health

Kazungula District is served by one district hospital and 24 health centres. Within Mandia Ward, key health facilities include Kazungula District Hospital, Kazungula Health Centre, Katombora Health Centre, and Mandia Health Centre, along with a private facility, Nico Memorial Clinic. These facilities provide a range of preventive, curative, and maternal-child health services to the local population.

5.3.9 Limitations to the ESIA Study

Baseline environmental and social studies were undertaken over a limited assessment period and in the absence of comprehensive long-term historical monitoring data. As such, the study may not fully capture seasonal variations in ecological and hydrological conditions, including wildlife movement patterns, vegetation dynamics, and flooding characteristics. The reliance on short-term field observations and available secondary data introduces a degree of uncertainty in baseline characterization and impact prediction.

In addition, the assessment places greater emphasis on impacts during the construction phase and early operation, with long-term and cumulative impacts assessed at a high level. Consequently, certain long-term, indirect, and cumulative effects—particularly those related to climate variability, land use change, and regional development—may not be fully quantifiable at this stage. These limitations will be addressed through the implementation of ongoing environmental and social monitoring and adaptive management measures throughout the project lifecycle, in accordance with ZEMA requirements.

6 ASSESSMENT OF ENVIRONMENTAL IMPACTS

The project is likely to have a number of positive and negative environmental and socio-economic impacts. This section identifies, assesses and discusses these impacts. Impacts were identified and assessed based on the significance and likelihood following the information gathered during the desk study and project site survey which included field visits that were undertaken in November 2025. The impacts are discussed according to whether positive or negative or both in section 6.1.1. The identified impacts apply to all project phases, namely site preparation and construction, operation, and decommissioning and closure.

6.1 Project Impacts' Identification

The ESIA has identified, predicted, and evaluated the anticipated environmental and social impacts of the proposed Project using recognized and accepted impact assessment methodologies. A systematic review of project activities was undertaken to ensure comprehensive coverage of all potential impact sources. The study team applied a combination of methods, including expert judgment, brainstorming sessions, checklists, and impact matrices, to identify key impact pathways and assess their significance. In addition, stakeholder engagement and public consultations were conducted to enhance the accuracy of the assessment, incorporate local knowledge, and reduce uncertainties (see Appendix 2).

6.1.1 Impacts on Biophysical Environment

Positive Impacts on the Biophysical Environment

In response to the Zambian government's international commitments to reduce atmospheric greenhouse gas emissions, the government has identified the energy sector for partly achieving this through a combination of renewable energy generating sources such as hydro, solar, wind, and biogas. The proposed 38 MWac PV Solar Plant Project will generate clean energy from the sun and feed it into Zambia's national grid. By diversifying the national energy mix—which is currently dominated by hydropower with a smaller contribution from thermal sources such as coal, heavy oil, and diesel—the project will enhance energy security and contribute to the reduction of greenhouse gas emissions associated with thermal power generation.

The proposed solar PV project will have positive impacts on the biophysical environment by contributing clean, renewable energy to Zambia's national grid and diversifying an energy mix that is currently dominated by hydropower, with a smaller contribution from thermal sources such as coal, heavy oil, and diesel. During operation, the project will not emit air pollutants such as SO₂, NO_x, or particulate matter, thereby maintaining good air quality and benefiting ecosystems, vegetation, and wildlife. Solar PV systems also require minimal water, mainly for occasional panel cleaning, which reduces pressure on surface and groundwater resources. By supplying up to 38 MWac of renewable power, the proposed PV Solar Plant will reduce the need for thermal power generation during periods of energy shortfall, indirectly lowering greenhouse gas emissions and minimizing land degradation, water pollution, and other environmental impacts associated with thermal fuel use, while enhancing climate resilience and supporting the long-term sustainability of natural ecosystems.

Negative Impacts on the Biophysical Environmental

The project will generate some negative impacts on the biophysical environment of the area. Notable impacts include

- a) Waste Generation in the form of
 - Gaseous waste from exhaust emissions from moving vehicles and equipment that has the potential to cause air pollution
 - Liquid Waste from accidental spills of oils and fuels that can cause the contamination of ground and surface water quality and soils

- Solid waste in the form of domestic waste from workers
- b) Increase in noise levels are likely to arise from the movement of heavy machinery and equipment
- c) Soil Compaction from the movement of vehicles and machinery
- d) Soil erosion from large exposed surfaces with loosened top soils
- e) These impacts are further discussed in Table 6-1.

6.2 Impacts on the Socioeconomic Environment

Positive Impacts on the Socioeconomic Environment

The project will result in a lot of positive socioeconomic impacts. The positive socioeconomic impacts outweigh the negative impacts that will result from the project. The following are some notable positive socioeconomic impacts identified:

- a) The project will improve the local economy by generating demand for local goods and services, thereby increasing household incomes, supporting local businesses, and contributing to sustained economic growth in the surrounding communities.
- b) Increase in employment opportunities: The proposed project will increase employment opportunities, particularly during the site preparation and construction phases. Priority will be given to members of the local community where the required skills are available. The project is expected to create approximately 200 temporary jobs and 90 permanent positions, comprising 40 female and 50 male employees for permanent positions.
- c) The project will increase public revenue for both central and local authorities through the payment of taxes, levies, licence and permit fees, and statutory contributions during the construction and operational phases. These revenues, together with land-related charges and service fees paid to local authorities, will strengthen public finances and support the provision of public services and local development initiatives.
- d) The project will improve the quality of life by creating employment opportunities and increasing household incomes, which enhances access to basic needs such as food, education, and healthcare. Reliable electricity supply from the project will support improved delivery of public services, stimulate local economic activities, and promote social development, while skills development and community engagement associated with the project will contribute to long-term social well-being.

These positive impacts are discussed in Table 6-2.

Negative Impacts on the Socioeconomic Environment

The Solar panel project will also generate negative impacts on the socioeconomic environment. Some notable impacts include:

- a) Influx of workers
 - Bringing in non-local construction workers may create social tensions with local communities.
 - Increased demand for housing, water, and public services can put pressure on local infrastructure.
- b) Health and safety risks
 - Construction equipment and activities pose risks of accidents, injuries, and exposure to dust or noise.
 - Increased traffic from heavy vehicles may cause accidents in nearby communities.
- c) Temporary economic inequality

- Short-term jobs may primarily benefit skilled workers or outsiders, leaving some locals without employment benefits.
- d) Pressure on local services
- The rise in population and construction activity can strain healthcare, water supply, sanitation, and waste management services.

The negative impacts on the socioeconomic environment are discussed in Table 6-3

6.3 Impact Assessment Criteria

The impact assessment criteria, outlined in the following sub-sections, have been applied to the assessment of each of the proposed Project elements during construction and operation stages. Evaluation of environmental and social impacts within this ESIA are considered against the baseline (including its value/sensitivity). In addition to the Key Principles provided by ZEMA, and as a basis for assessing environmental impacts, the methodology applied to this ESIA has been developed using a combination of the criteria, methodology and guidance provided by international requirements/best practice.

The ZEMA principles are as follows:

Nature and magnitude of the intended activity and the existence of similar projects at the site or similar sites;

Extent of the impact of the proposed project;

Location of the project and the nature of the surrounding environment and nearby residential clusters

The ESIA methodology has been adopted in combination with ZEMA requirements on ESIA content. The following factors were considered in classifying each potential impact generated by the Project as presented in Table 6-4:

- **Frequency:** Occurrence of activity producing the impact, e.g. continuous, intermittent or a single event/less than once per year;
- **Likelihood:** Probability of impact occurrence (e.g., 100%, 50%, 0%);
- **Extent:** Spatial extent of the impact (e.g. within 2km of site boundary, outside the Project site but within 20km, within 200km, within Zambia, outside Zambia);
- **Duration:** Extent in time of the impact. Short term impact (less than the life of the project), medium term impacts (equal to the lifetime of the Project) and long term impacts (greater than the lifetime of the Project);
- **Magnitude:** Impact magnitude defined in relation to the limit criterion specified by ZEMA or international standards where available;
- **Type of impact:** Positive or negative effect; direct or indirect action;
- **Potential significance:** A combination of all the factors described in the preceding bullet points is used to determine the type and significance of potential impact prior to mitigation. This is defined as low, medium or high.

Table 6-4 presents the terminology used throughout Section 6 to describe and rank environmental and social impacts according to the categories defined above.

Table 6-1: Terminology used to describe environmental and social impacts

Category	Terminology	Definition
Scope of Impact ⁽¹⁾		
Frequency	Frequent Infrequent Rare	Uninterrupted or on a daily basis Once or more per day Less than once per day Single event/less than once per year
Likelihood	Certain Likely Unlikely No impact	Impact possibility estimated to be 100% Impact possibility estimated as between 50% and 99% Impact possibility estimated as < 50% Zero estimated possibility of impact
Extent	Local Provincial Regional National International	Within 2 km of the Project site Outside the Project site but <20 km away Outside the Project site but < 200 km away Within Zambia Outside Zambia
Duration	Short Medium Long	Less than the life of Project The life of project Greater than the life of Project
Magnitude ⁽²⁾	Very low Low Medium High Very high	Defined in relation to the limit criterion where available, e.g.: Very low: Parameter < 10% limit criterion Low: Parameter 10 to <50% limit criterion Medium: Parameter 50 – 100% limit criterion High: Parameter 100 – 200% limit criterion Very High: Parameter > 200% limit criterion. Or, for qualitative assessments: Very low: No degradation/adverse alteration to resource/receptor Low: Minor degradation/adverse alteration to resource/receptor Medium: Moderate degradation/adverse alteration to resource/receptor. High: Significant degradation/adverse alteration to resource/receptor. Very High: Permanent degradation/detrimental alteration to resource/receptor.
Type of Impact		
Effect	Positive Negative	Beneficial impact Adverse impact
Action	Direct Indirect	Impact caused solely by activities within scope of Project Impact which does not result directly from by activities within the scope of Project, but which has a connection with the Project's presence.
Potential Significance		
Significance	Low Medium High	Any low magnitude impact, or medium magnitude impact that is unlikely to occur or is of short duration. Any medium magnitude impact that is certain or likely to occur and of medium or long duration. Also, any high magnitude impact that is unlikely to occur, of short duration, or local in extent. Any high magnitude impact that is certain or likely to occur, of medium or long duration, and regional in extent.
(1)	All terms are characteristics of the impact(s). For example, duration refers to duration of impact, not the activity causing it.	

Category	Terminology	Definition
(2)		As indicated, the impact magnitude for some environmental aspects can be defined in relation to the limit criterion specified by ZEMA or international regulations, or best practices when national standards are not available. However, in the absence of definitive quantitative criteria, a qualitative assessment of the magnitude is used relating to the impact type.

6.4 Impact Assessment Reporting

The findings of the assessment process for each environmental aspect are presented in sections 6-7 with the significance of any predicted environmental impacts being defined as Low, Medium or High. Impacts predicted as being of medium to high significance are then assessed against appropriate mitigation measures to predict the residual impact significance.

Table 6-2: Example of Impact and Mitigation summaries

Impact	Potential Significance	Mitigation Measure	Significance after Mitigation
Increase in Vehicle movement will result in potential road traffic accidents during Construction	High	A structured approach to traffic management and vehicle standards should be specified and safety measures should be implemented. Ensure the transport plan for the Project is developed and implemented during the lifetime of the project. Establish pedestrian routes within the construction area to be used by workers;	Medium

6.5 Mitigation Measures and Reporting

Two types of mitigation measures are identified in this ESIS Report in order to alleviate or manage the potential impacts identified:

- Measures to be taken to manage potential impacts considered to be of medium or high significance. Following application of these measures, residual impacts are expected to be lower.
- Recommended measures that could be taken to manage impacts classified as low/insignificant. These measures can be considered as good management practices.

6.6 Evaluation of Impact Significance

The significance of the identified impacts was determined by combining the perceived frequency of occurrence of the source of impact; the duration of the impact; the severity of the impact; the spatial extent of the impact; and the sensitivity of the area being impacted upon. The sections below give a detailed description of how each of the aspects was assessed.

6.7 Ranking of the Significance of Impacts

The significance of the impacts was ranked by taking into consideration four main factors namely: -

- Duration of the Impact: Which defines whether the impact is temporal or permanent;
- Spatial extent of the impact: Which defines the area to be affected by the impact;
- Severity of the Impact: Which is the severity/beneficial or simply the state or extent of the badness of the impact. It takes into consideration among other things, sensitivity of the area being impacted upon; and

- f. The likelihood of occurrence: Which looks at the probability of the impact occurring and frequency of occurrence where it occurs.

The four criteria above were ranked with scores assigned to each as presented in Table 6-3. To come up with the overall significance of the impact, the scores for each impact were considered in two categories namely “effect” (which comprises duration, special extent and severity) and “likelihood of occurrence” (Table 6-3). The total scores recorded for the ‘effect’ and ‘likelihood’ were then read off from the matrix table presented in Table 6-4.

Table 6-3: Ranking of evaluation criteria

	DURATION OF IMPACT		SCALE
EFFECT	Short Term	Confined to construction phase	1
	Medium Term	Up to three years	2
	Long Term	3 to 20 years	3
	Permanent	Above 20 years	4
	SPACIAL EXTENT OF THE IMPACT		
	Localised	At localised scale covering a few hectares	1
	Study Area	Programme area including immediate environment	2
	Regional	District or provincial level	3
	National	Country level	4
	International	Beyond national boundaries	5
	SEVERITY		
	Slight	Little impact	1
	Moderate	Moderate impact	2
	Severe	High impact	3
	Very severe	Very high impact	4
LIKELIHOOD	LIKELIHOOD OF OCCURENCE		
	unlikely	Will not Occur	1
	May Occur	There is a small chance of this impact	2
	possible	The likelihood of this impact occurring is probable	3
	Certain	The likelihood is that this impact will definitely occur	4

Table 6-4: Ranking of evaluation criteria matrix

LIKELIHOOD		EFFECT														
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	
	1	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
	2	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
	3	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
	4	7	8	9	10	11	12	13	14	15	16	17	18	19	20	

Table 6-5: Description of overall significance ratings

Significance Rating	Description	Score Range
LOW	This refers to an impact with acceptable effects for which mitigation is desirable but not essential. The impact by itself is insufficient to prevent programme approval. Effects from these impacts do not go beyond medium term	4 to 7
MODERATE	Impacts for which mitigation measures are required though impact cannot prevent programme approval. The impacts can extend up to long term	8 to 11
HIGH	This is a serious impact which, if not mitigated, may prevent programme approval (if negative). These impacts can result in major and usually long-term effects to the environment	12 to 15
VERY HIGH	This is a very serious impact which if negative may, by itself, be sufficient to prevent programme implantation. This type of impact results in permanent change and usually has no mitigation measures	16 to 20

6.8 Summary of Impacts

The identified impacts are summarised in Table 6-6. The overall significance of impacts, based on the above evaluation criteria, is presented.

Figure 6-1: Impacts of the Biophysical Environment during the Project Phases

Impact		Impact Description	Impact Evaluation								
			Frequency	Likelihood	Extent	Duration	Magnitude	Effect	Action	Sensitivity	Significance
Impacts on Biophysical Environment											
Air pollution		Site clearing and levelling of the area. These may lead to dust emissions with the potential to disturb the local air quality.	Infrequent	Likely	Local	Short term	Low	Negative	Direct	High	High
Soil pollution		Pollution of soil may result from accidental spillages of oils and other hydrocarbons from construction equipment	Infrequent	Unlikely	Local	Short term	Low	Negative	Direct	Medium	Medium
Increased erosion and sedimentation	Soil	Soil disturbance will result from knocking down of trees. These disturbances expose the soils to a very high risk of erosion especially during rainy and windy seasons. Soil erosion is a serious problem as it has the potential to interfere with water quality directly through increasing turbidity levels, siltation and indirectly from contaminants carried with or attached to eroded soil particles.	Infrequent	Likely	Local	Short term	Low	Negative	Indirect	Low	Low
Increased noise levels	noise	The results of the noise measurements carried out showed that the noise levels in the project area are very low (range 20.3 to 27.5 dBs < 85dBs ZABs standard). However, during construction phase some noise will be generated due to moving machines. However, these impacts are expected to be significantly low (will still be below the standard 85dB).	Infrequent	Likely	Local	Short term	Low	Negative	Direct	Medium	High

Water Pollution	During site preparation and clearing of vegetation; there is a possibility of contamination of surface and ground water due to runoff. Contamination of ground and surface water may also result from oil leakages and spillages from not well-maintained machinery and equipment during both the construction and operation phase	Infrequent	Unlikely	Local	Short term	Low	Negative	Direct	High	Low
Increased Waste and Hazardous Materials	Some amounts of waste will be generated during the construction phase of the project. There will be wastes such as battery acid, fuels, used batteries, used oils and brake fluid though will be in very minimal amounts. With well-maintained machines and equipment, these may not be a problem.	Frequent	Likely	Local	Short term	Low	Negative	Direct	Medium	Medium
Destruction of Vegetation, Wildlife and Wildlife Habitat	The project will involve the clearing of about 50 hectares of land to pave way for the establishment of the Solar PV plant. This natural land is the habitats for mammals and insects. Therefore, clearing of vegetation will result in the habitat of certain animals being interfered with	Rare	Likely	Local	Short term	Low	Negative	Direct	Low	Medium
Disruption to ecology and biodiversity	Removal of trees may affect the ecology and biodiversity of the area	Infrequent	likely	Local	Short term	Low	Negative	Direct	Medium	Low
Archaeology and Cultural Resources	Construction activities may cause damage to Archaeology and Cultural Resources	Rare	Unlikely	Local	Short term	Low	Negative	Direct	Low	Low
Landuse change	Will lead to land use change from partly disturbed, with patchy vegetation to solar plant	Infrequent	likely	Local	Medium term	Low	Negative	Direct	Low	Low

Impacts on Socioeconomic Environment											
Improved local economy	Generation of business opportunities to local contractors and individuals in the area	Frequent	Likely	Local	Medium term	High	Positive	Direct	High	High	
Increased employment opportunities	This project will provide direct employment opportunities over the construction cycle and operation phase. The project will require skilled technicians and crafts people as well as un-skilled labour and will offer many employment opportunities for persons from within local communities, including women.	Frequent	Likely	Local	Medium	High	Positive	Direct	High	High	
Increased Public Revenue/ Taxes	The implementation of the project will increase revenue and taxes for both the central and local authorities.	Frequent	Likely	Local	Medium	Low	Positive	Indirect	High	High	
Accelerated Rural Development and Infrastructure	The project is fully compatible with the general trend of development in the area and will maximise the potential of the area. It is expected that the proposed development will indirectly lead to infrastructure development.	Frequent	Likely	Local	Medium	Low	Positive	Indirect	High	High	
Enhanced business opportunities	The presence of the project will increase business for most local products as workers will be able to buy goods and services from local people. This impact will be highly localised.	Frequent	Likely	Local	Medium	Medium	Positive	Indirect	High	High	
Spread of Sexually Transmitted Disease by Migrant Workforce	Increased transmission of communicable diseases – due to in-migration of people Increased transmission	Rare	Likely	Local	Short term	Medium	Negative	Direct	High	Medium	
Public Safety	The construction site is located away from settlements, so public access is limited and there is minimal risk to individuals, including children,	Rare	unlikely	Local	Short term	Medium	Negative	Direct	Medium	Medium	

	from construction activities.									
Land Acquisition and Involuntary Resettlement	No settlements exist within the project site thus no disruption to people's lives: Residents will not need to move, avoiding displacement, loss of homes, or changes to livelihoods.	Infrequent	Likely	Local	Short term	Medium	Negative	Direct	Medium	Low
Occupational Health and Safety Risks	Construction activities may expose workers to occupational health and safety risks, potentially resulting in injuries.	Infrequent	Likely	Local	Short term	Medium	Negative	Direct	Medium	Medium
Accidents	The movement of vehicles and trucks transporting construction materials to the site may increase the risk of traffic-related accidents, particularly if speed limits and safety regulations are not observed.	Rare	Unlikely	Local	Short term	Medium	Negative	Direct	Medium	Medium
Pressure on existing resources and social amenities	During the construction stage, demand for basic amenities such as water, fuel and other services may put pressure on the existing resources.	Rare	Unlikely	Local	Short term	Low	Negative	Indirect	Low	Low
Landscape and Land Use Impacts	The area is partly disturbed, with patchy vegetation, which will be cleared to allow the development of a structured solar PV facility.	Infrequent	Likely	Local	Long	Low	Negative	Direct	Low	Low
Income to Suppliers and Contractors	Local suppliers of materials and equipment and contractors who will get involved in the project will benefit financially	Frequent	Likely	Local	Medium	Medium	Positive	Direct	Medium	Medium
Creation of Wealth	Numerous opportunities will be available for investment and procurement, allowing the youth and residents of Kazungula to provide a variety of goods and services to the Project throughout its lifecycle.	Frequent	Likely	Local	Short term	Medium	Positive	Direct	Medium	Medium

7 ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

7.1 Environmental and Social Management Plan (ESMP)

This Environmental and Social Management Plan (ESMP) (Table 7-1) represents VFU-CEL commitment to address and manage the potential negative and positive impacts associated with the proposed 38MWac PV Solar Plant project, and defines the standards and guidelines to be achieved in terms of environmental legislation, policy and standards. The ESMP involves the protection, conservation and sustainable use of the various elements or components of the environment. The ESMP for the proposed project provides all the details of project activities, impacts, mitigation measures, time schedules, costs, responsibilities and commitments proposed to minimize environmental impacts of activities, including, monitoring and evaluation and environmental audits during implementation and decommissioning phases of the project.

The ESMP is a very important output of ESIA since it provides the framework or checklist for project monitoring and evaluation/audit. Mitigation measures provided in this section are aimed at making changes in any of the following ways: project materials, raw materials, project sites to mention but a few. The main objectives of the ESMP are to:

- Ensure the project is compliant with applicable national environmental and social legal requirements.
- Identify the required mitigation measures that are needed in order to reduce negative impacts and enhance positive ones.
- Ensure that all mitigation measures and recommendations identified during the environmental impact assessment are incorporated into documents that are referenced and expanded if necessary, during the various phases of the project.
- Outline the mitigating/enhancing, monitoring, consultative and institutional measures required to prevent, minimize, mitigate or compensate for adverse environmental and social impacts and/or to enhance project related beneficial impacts.
- Address human resource requirements to ensure implementation of the ESMP is possible.

To achieve the above, the ESMP ensures that:

1. During project planning and design, all mitigation measures identified in the ESIA that can be incorporated into the planning and design of the project are considered during the detailed planning and design phase.
2. During construction all constraints, restrictions and actions required to minimize construction related impacts are implemented.
3. During commissioning and operation, detailed operating procedures are developed so that all constraints, restrictions and actions required to minimize impacts caused by commissioning and operation are developed, implemented and monitored for all aspects of the project.
4. During the life of the project, continue to enhance positive impacts and ensure mitigation for negative impacts. An important component of this monitoring, evaluation and communication of findings, and adherence to the principle of continued improvement.
5. During decommissioning, detailed procedures are developed to ensure that the project area is rehabilitated to an acceptable and previously agreed-to level.

The ESMP is an umbrella plan that describes the management of environmental, health and safety (EH&S) matters and that will be complemented and augmented by a number of sub plans as described in this report.

7.1.1 Implementation of Environmental and Social Measures

Ultimately, the Project Owner VFU-CEL is responsible for the implementation of all environmental and social mitigation measures identified and described in the ESIA. However, these measures can be grouped in two main categories as follows, for which responsibilities will be organized differently:

- Measures directly related to construction and the construction site: implementation of most if not all of these measures will be attributed directly to the Contractor (and the Contractor will have to make sure, if the case arises, that his sub-contractors will also comply with them). In these cases, VFU-CEL's responsibility will mainly be the control and monitoring of the Contractor's performance. The relevant measures – and sub-plans to be prepared – for this category are described in Section 7.3.7 and in the Data Sheets in Appendix 3.
- Measures not related to construction activities and/or the construction site: Here, the Owner will be directly responsible for implementation, which will be done either by the Project Implementation Unit (PIU), the Owner's Engineer or a third party (but usually not the contractor) specially appointed by the Owner for this purpose.

7.1.2 Summary of Main Impacts and Mitigation Measures

In this ESIS Report, environmental risks and impacts likely to emanate from project elements or project-related activities are described. This Section takes up the synopsis of the impacts, with their importance, and lists the required or proposed mitigation measures, where such measures seem necessary for minimising the impact as far as possible or reducing the risk to an acceptable level. The mitigation measures for impacts with 'medium' to 'high' significance have been summarised in Table 7-1.

7.1.3 Overall Impact Evaluation

The main conclusions of the analysis in this Report are the following:

- Most impacts are rather small and easily mitigated, if mitigation is required at all.
- There is no impact of the category "strong negative, mitigation not possible", which would have to be considered as a no-go for the project.

7.2 Environmental and Social Monitoring Plan

Monitoring of all the environmental protection measures described in the ESMP has to be carried out in the way outlined. The aims of monitoring are the following:

- g. To check on compliance with the conditions set forth and standards to be met;
- h. To inform the relevant authorities on observed cases of non-compliance;
- i. To propose corrective measures for such cases;
- j. To check on the success of these measures.

The environmental and social monitoring plan is described in Table 7-2.

Table 7-1: Environmental and Social Management Plan (ESMP)

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
Excavation of foundations for solar PV panels and associated support infrastructure.	Construction activities and transportation activities	Air pollution (pollution (dust, exhaust gases) mainly by nitrogen oxides (NOx) and Particulate Matter (PM10)	high - negative → impact, localised to construction site, and limited to the duration of construction	- Appropriate warning shall be given to the general public about any major works being undertaken that may disturb the public. - All heavy equipment and machinery shall be fitted with air pollution control and noise dampening devices that are operating correctly and that can operate within the Zambian statutory requirements for the areas of operation (e.g. sensitive locations besides schools or open country). - Works contractor with VFU-CEL will conduct consultation with the community to warn of potential discomforts, contractor methods of reducing pollution and discuss additional methods households may wish to further reduce discomforts. - Use of a water bowser to reduce the amount of dust generated.	Low negative reduction of quantity of exhaust gas, dust; will be within legal limits	Environmental, Health and Safety Management and Monitoring of the Contractor Equipment Maintenance Management Plan Air Quality Management Plan
	Construction activities	Soil pollution	Negative	- The maintenance of machinery and equipment has to be done in workshops; liquids including cleaning water should be collected in tanks. - Storage of fuel and lubricants has to be in tight containers placed on sealed surfaces underneath a roof. The storage has to be equipped with all safety measures to prevent oil spilling including firefighting equipment. The area needs to be marked. - Sufficient quantities of oil absorbent have to be stocked and have to be easily accessible in case of an oil spill. The contaminated absorbent has to be disposed of properly. - Hazardous waste has to be stored in designated closed tanks or areas. - Solid waste generated during will be properly treated and safely disposed of only in demarcated waste disposal sites. - All activities which could contaminate the soil have to be carried out on sealed surfaces. If accidental spillage occurs, the contaminated soil has to be excavated and disposed of properly (final treatment or disposal shall be done by a suitably qualified company and in accordance with the Zambian Hazardous Waste Management Regulations of 2001).	small negative → reduced risk of soil contamination; unexpected spills and leakages will be treated properly and fast, the contamination of soil will be locally and due to clean-up mechanisms not spread into the surrounding or drained into the water and/or groundwater	Environmental, Health and Safety Management and Monitoring of the Contractor Equipment Maintenance Management Plan Waste Management Plan Hazardous Material Management Plan Pollutant Spill Contingency Plan
	Construction activities, movement of vehicles and heavy machines	Increased noise levels	Negative	- Use of mufflers, silencers, and screens to minimize noise from construction activities; - Vehicle movements and operation of loud machinery and equipment will be restricted to daylight hours	None	Occupational Health and Safety Plan Health and Safety Management Plan during operation

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
Vegetation clearance	Construction area	Soil erosion Main risks: Soil erosion: - Creation of open and erosion-prone surfaces during construction phase (amongst others whilst levelling the ground of the project site). → In the absence of vegetation cover the soil will become more susceptible to erosion. - Small negative effect (visibility, change in morphology). While a natural process, erosion can locally be accelerated by the project.	Medium - Negative	- Fill should be compacted properly in accordance with the Specifications. - Unsuitable and surplus excavated materials shall not be disposed to locations or in a way that it will subsequently be prone to erosion. - Protect slopes from erosion, where bare slopes are exposed as a consequence of the works limit the period of exposure to water or wind erosion and provide temporary or the designed slope protection at the earliest opportunity, measures shall include covering with sheeting, bioengineering (seeding and planting) geotextiles, gabion boxes and mattress, riprap and other physical measures that will hold unstable soil. - Minimise or protect areas of bare soil throughout the rainy season. - Precautions as necessary to prevent erosion of areas under construction throughout the rainy season including excavation/fill/etc. any areas that cannot be completed prior to the rains. - Planting with indigenous species. - Exposed areas shall be protected using conventional civil engineering structures in conjunction with bioengineering techniques similar to but not limited to those recommended above for slope protection. - In the short-term, either temporary or permanent drainage works shall protect all areas susceptible to erosion. Measures shall be taken to prevent ponding of surface water and erosion of slopes. Newly eroded channels shall be backfilled and restored to natural contours. - Restoring all areas used temporarily for the works immediately these areas are no longer required including borrow areas and temporary lay down areas.	Low - negative → The erosion prevention control measures during construction and operation will considerably reduce the soil erosion	Environmental, Health and Safety Management and Monitoring of the Contractor Erosion Control Plan Site Rehabilitation / Re-Vegetation Plan Excavation Spoil / Fill Management Plan
	Construction activities	Loss of wildlife habitat Especially in areas where there will be clearing of some regenerating trees	Medium – Negative Impact of minor importance since no critical natural habitats and area not of major importance for conservation of biodiversity	- Confine vegetation clearance to areas where structures will be built - Do not clear vegetation or damage vegetation outside of the worksite, do not cut trees, damage root system or lop branches without prior consent of local authority and forest department - No tree cutting during the nesting season. - If identified, rare, endangered, threatened or endemic species or their habitats to be persevered or transferred as per ZEMA instructions. - Avoid stock piling of materials on vegetated areas. - Monitor stockpiling. - Plant appropriate seedlings, indigenous to the area to regenerate vegetation to pre-project state. - Use of soil reinforcement where necessary to promote establishment of vegetation cover, biodegradable soil reinforcements can be used. - Works contractor responsible for vegetation until established.	Very small - none	Site Rehabilitation / Re-Vegetation Plan

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
Generation of non and hazardous waste	Construction and some operation activities	Water pollution Contamination of soil, water, health risk; due to: - Domestic waste (mainly during construction). - Liquid waste (from maintenance of all Lorries and construction machinery). - Hazardous waste (e.g. from maintenance of machinery).	Negative	- No solid waste, fuels or oils should be discharged into water flows. - Test water samples from dewatering operations for contaminants according to ZEMA, Zambia guidelines for discharge of effluents, which when exceeded, advice on appropriate discharge should be sought. - Hold and store sanitary and cleaning wastes in appropriate containers to be disposed of at approved sites. - Park vehicles preferably on paved platforms. - Fuel storages should not leak, and should be periodically monitored, and repaired or replaced when necessary. - Sites for cleaning, fueling and maintaining vehicles should be able to prevent leakage (e.g. paved). - Maintain fuel and clean vehicles and equipment at workshops/sites with adequate leakage prevention (e.g. impermeable surface, settlers and oil separator). - Storing hydrocarbons and hazardous materials on impervious ground under cover and constructing the storage area as a spill tray to avoid spread of accidental spills.	small negative / none appropriate waste handling measures result in minimisation of contamination of the environment and in improved health protection	Waste Management Plan Hazardous Material Management Plan
	Operation activities	Odours generated and released to the surrounding area during the process of chemical spray.	Medium - Negative	- Ensure appropriate warning is given to the communities nearby - Apply when the wind is calm - The perimeter of the proposed site should be vegetated with trees and plants of varying heights thereby forming windbreaker and reduce dispersion of odour;	Low - Negative	Waste water management plan
	Operation activities	Contamination of nearby streams/rivers. There is a possibility of agriculture chemicals flowing into nearby rivers or streams	Medium - Negative	Regular monitoring and sampling of the water of the receiving water bodies;		Water pollution prevention plan, Monitoring plan
Handling, Storage and disposal of Hazardous Materials	Construction phase	Impacts on workers' health	Negative	- Storing hydrocarbons and hazardous materials on impervious ground under cover and constructing the storage area as a spill tray to avoid spread of accidental spills. - Providing safe ventilation for storage of volatile chemicals. - Restricting and controlling access to areas containing hazardous substances. - Site all hot mix plant, crushing plant, workshops, depots, and temporary workers accommodation facilities in approved locations. - Using refrigerants and fire extinguishing agents in accordance with the 'Montreal Protocol'. - PPE for operatives. - Document safe disposal of hazardous or contaminated waste; including disposal sites and volumes. - Identify, in coordination with ZEMA as required, potential safe disposal sites for hazardous or contaminated waste. Investigate the environmental conditions of the disposal sites and prepare a recommendation for most suitable and safest site(s). - Designate disposal sites to be used in the project.	Small/None Once mitigation measures are implemented, remaining impact will be very small if none	Waste Management Plan Hazardous Material Management Plan

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
Movement of heavy trucks, vehicles and machines	Construction phase	Injuries to pedestrians, increased road traffic accidents	Negative	- All motorists will be encouraged to move within the speed limit. Adequate signage will be installed along the roads within the project area - Entry into the project area will be restricted to workers only - Contractor will ensure that alternative spaces in communities will be provided for public vehicles to stop and pick-up passengers safely	Small/None Once mitigation measures are implemented, remaining impact will be very small if none	Traffic management plan
Public consultation	Increased awareness about the project. All types of potential effects of the Project on the directly affected population. Knowledge about the Project by all interested parties.	Impact will be medium	Positive or negative	Providing good and timely information on the project: - information on ongoing and planned works - receiving of and dealing with complaints by affected or interested public - public disclosure of relevant documents	mostly positive adequate solving of any problems that might arise with any stakeholders	Public consultation and disclosure plan (public consultation and community relation management plan)
Occupational Health and Safety	Mainly Construction Phase and Operation Phase	Work accidents, occupational diseases (skin irritation, noise, etc.)	Negative	- Develop occupational health and safety procedures such as wearing of protective equipment, proper handling of hazardous substances, etc. - All workers have to use the relevant protective equipment (helmet, gloves, goggles, work boots, masks, ear plugs, etc.), provided free of charge. - All restricted plant facilities have to be labelled with caution signs, especially those with potential risk for workers. Label transmission line poles indicating danger, high voltage. - All construction areas shall be marked and fenced to avoid accidents involving unauthorised people. Fence off all areas such as excavation pits, quarries, etc. to prevent accidents. - First aid kits and facilities need to be available at the construction site for fast action if an accident occurs. Workers should be provided with First Aid Training. - Accessible consultation sheets for review in case of contingency or emergency situations. These should have phone numbers for police, fire fighters, Red Cross, personnel supervisor or project leader. - Prepare a scheme of the evacuation routes and where the fire extinguishers are located within the plant and place them at conspicuous places. - Maintenance of machinery (preventive and corrective; during construction and operation). - Assign a special area for food consumption during construction. - Workshops and camp site must have	none / small positive reduction of accidents, health protection, appropriate reaction in case an accident happens	Occupational Health and Safety Plan Health and Safety Management Plan during operation

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
Presence of the project in the area	Construction and Operation phases	Increased employment opportunities	Small - positive	- Workers will be employed locally, where possible, without discrimination of gender, race, religion, and for unskilled positions for low literate. - Avoiding conflicts with local communities by providing resources for worker requirements at works contractor's temporary operational sites. - Avoiding the potential spread of vector borne diseases and communicable diseases, such as STIs and HIV/AIDS by controlling the contact of workers with awareness programmes, and regulation. - Achieve 30% minimum target employment for women (including equal remuneration for similar work) jobs are targeted for women in order to promote and increase opportunities and participation for women during construction. - Opportunities will be for skilled, semi-skilled and unskilled positions	High - positive	Recruitment plan
	Construction and Operation phases	Enhanced business opportunities	Positive or negative	Encourage workers to buy from locals	Mostly positive - impact will be high after enhancement measures	N/a
	Construction and Operation phases	Income to Suppliers and Contractors	Medium - Positive	- Source local materials, skills and services. These include plant (pump sets, switch gear, instrumentation and chemicals) steel and plastic, cement, sand, etc. - Earth materials needed for construction, for example, aggregate (stones and sand) is obtained from quarry operations. Conscious or unwitting purchase of these materials from unlicensed operations indirectly promotes environmental degradation at illegal quarry sites and can cause medium- to long-term negative impacts. It should therefore be a contractual obligation for contractors to procure construction materials from quarries legitimately licensed by Kazungula District Council and duly approved by ZEMA.	Mostly positive - impact will be high after enhancement measures	Procurement and contracting plan
	Construction phase	Pressure on Existing Resources	Medium - Negative	- Through inductions and tool box meetings, VFU-CEL will ensure that contractors are conversant with resource conservation practices in all project activities. - Earth materials will be sourced from ZEMA-approved sources in a manner that reduces environmental and social impacts. Approved sources are known and easy to monitor and regulate by both the district local administration and ZEMA. - Water conservation measures will be encouraged: saving water is an efficient way of reducing the overuse of ground water resources. It not only decreases the amount of the water withdrawn, but may also reduce the threat of pollution.	Small/None Once mitigation measures are implemented, remaining impact will be very small if none	None

Aspect	Project Component	Impact and significance before mitigation/enhancement	Importance	Mitigation/Enhancement Measure	Remaining impact after mitigation/enhancement	Related Sub Monitoring and Management Plans (S-MP)
	Construction phase	Creation of Wealth	Medium - Positive	Encourage workers to support local business and services such as food vendors	Mostly positive - impact will be high after enhancement measures	N/a
Influx of workers to the area	Construction phase	Increased market for local goods	Positive	Encourage workers to buy from local people for goods and services that area available in the area	Medium – positive after enhancement	N/a
	Construction phase	Increased conflict between workers and locals	Negative	- Preparing workers to avoid conflict situations through orientation and awareness programmes. - Avoiding damage to utilities by ensuring that vehicles and equipment are operated by trained personnel, and that operations are adequately supervised.	None	Public consultation and disclosure plan (public consultation and community relation management plan)
	Construction phase	Stress on public health facilities as there will be an influx of people looking for jobs	Negative	- Give first priority to local members of the community when employing - Support government programmes on health such as rehabilitation and construction of health facilities	None	Recruitment plan Public consultation and disclosure plan (public consultation and community relation management plan)
	Construction phase	Spread of communicable diseases	Medium - negative	- Health education on the dangers and prevention of communicable - Insert prevention intervention clauses in construction contracts. - Maximise employment of local labour for construction work. - Focus on behaviour change for workforce, not just raising awareness - Tailor messages to the general workforce, as well as men and women - Provide male and female condoms for construction workers. - Educate construction workers on how to avoid STI, to recognize common STI symptoms, and to seek treatment via confidential referral systems. - Publicize to workers the existence of anonymous VCT service (testing, pre-test, and post-test counselling). - Educate construction workers on how to avoid Opportunistic Infections, to recognize common Opportunistic Infections symptoms, and to seek treatment - The Contractor in collaboration with Ministry of Health shall take measures to educate and sensitise the labour force on the risks of communicable diseases (malaria, TBC, STDs, including HIV/AIDS etc.). How infections are transmitted, how to recognise symptoms, what should be done and on prevention measures. Male and female condoms shall be distributed to workers by the Contractor free of charge. - Overall good housekeeping contributes to maintain hygienic and safe conditions on the construction site.	Small - negative	Recruitment plan Public consultation and disclosure plan (public consultation and community relation management plan)

Table 7-2: Environmental and Social Monitoring Plan

Aspect	Impact	Mitigation/Enhancement Measure	Frequency of Monitoring	Time-Frame	Performance Indicator	Responsible Person	Cost (US\$)
Excavation of foundations for solar PV panels and associated support infrastructure.	Air pollution (pollution (dust, exhaust gases) mainly by nitrogen oxides (NOx) and Particulate Matter (PM10))	- Appropriate warning shall be given to the general public and drilling locations shall be appropriately secured before blasting. - All heavy equipment and machinery shall be fitted with air pollution control and noise dampening devices). - Works contractor will conduct consultation with the community to warn of potential discomforts, contractor methods of reducing pollution and discuss additional methods households may wish to further reduce discomforts. - Use of a water bowser to reduce the amount of dust generated.	Weekly	Throughout construction phase	Digging and drilling done after appropriate warning is given	Contractor (Implementation)	10,000
	Soil pollution	- Regular servicing and maintenance of equipment and vehicles. - Contaminated soil shall be removed/treated immediately	Whenever it occurs	Throughout construction phase	Soil pollution within standard	Contractor (Implementation)	10,000
	Generation of noise	- Use of mufflers, silencers, and screens to minimize noise from construction activities; - Vehicle movements and operation of loud machinery and equipment will be restricted to daylight hours	Daily	Throughout construction phase	Noise level within standard	Contractor (Implementation)	15,000
	Disturbance to Archaeology/ Cultural Resources	- Close monitoring during construction to avoid accidental damage including damage from vibration. - Anything uncovered is reported to National Heritage Conservation Commission (NHCC)	Daily	Throughout construction phase		Contractor (Implementation)	10,000

Aspect	Impact	Mitigation/Enhancement Measure	Frequency of Monitoring	Time-Frame	Performance Indicator	Responsible Person	Cost (US\$)
Vegetation clearance	Soil erosion	- Fill should be compacted properly in accordance with the Specification. - Unsuitable and surplus excavated materials shall not be disposed to locations or in a way that it will subsequently be prone to erosion. - Protect slopes from erosion, where bare slopes are exposed as a consequence of the works limit the period of exposure to water or wind erosion and provide temporary or the designed slope protection at the earliest opportunity, measures shall include temporary or permanent drainage including check dams and may also include covering with sheeting, bioengineering (seeding and planting) geotextiles, gabion boxes and mattress, riprap and other physical measures that will hold unstable soil. - Minimise or protect areas of bare soil throughout the rainy season. - Precautions as necessary to prevent erosion of areas under construction throughout the rainy season including excavation/fill/etc. any areas that cannot be completed prior to the rains. - Planting with indigenous species. - Exposed areas shall be protected using conventional civil engineering structures in conjunction with bioengineering techniques similar to but not limited to those recommended above for slope protection. - In the short-term, either temporary or permanent drainage works shall protect all areas susceptible to erosion. Measures shall be taken to prevent ponding of surface water and erosion of slopes. Newly eroded channels shall be backfilled and restored to natural contours. Check dams and/or drop structures with designed stilling basins will be provided on steep slopes. - Restoring all areas used temporarily for the works immediately these areas are no longer required including borrow areas and temporary lay down areas.	Weekly at active worksites and thereafter as necessary during the period of use but not less than quarterly.	Throughout construction phase		Contractor (Implementation)	5,000
	Loss of wildlife habitat	- Minimise damage to trees. - Do not clear vegetation or damage vegetation outside of the worksite, do not cut trees, damage root system or lop branches without prior consent of local authority and forest department - No tree cutting during the nesting season. - If identified, rare, endangered, threatened or endemic species or their habitats to be persevered or transferred as per ZEMA instructions. - Avoid stock piling of materials on vegetated areas. - Monitor stockpiling. - Plant appropriate seedlings, indigenous to the area to regenerate vegetation to pre-project state. - Use of soil reinforcement where necessary to promote establishment of vegetation cover, biodegradable soil reinforcements can be used. - Works contractor responsible for vegetation until established.	Weekly at active worksites and thereafter as necessary during the period of use but not less than quarterly	Throughout construction phase	Number of trees planted	Contractor (Implementation)	10,000
	Disruption to ecology and biodiversity	Supporting revegetating and environmental programmes	Annually	Throughout operation phase	Number of environmental programmes supported	VFU-CEL (Implementation)	15,000

Aspect	Impact	Mitigation/Enhancement Measure	Frequency of Monitoring	Time-Frame	Performance Indicator	Responsible Person	Cost (US\$)
Generation of non and hazardous waste	Water pollution	- No solid waste, fuels or oils should be discharged into water flows. - Test water samples from dewatering operations for contaminants according to ZEMA, Zambia guidelines for discharge of effluents, which when exceeded, advice on appropriate discharge should be sought. - Hold and store sanitary and cleaning wastes in appropriate containers to be disposed of at approved sites. - Park vehicles preferably on paved platforms. - Fuel storages should not leak, and should be periodically monitored, and repaired or replaced when necessary. - Sites for cleaning, fueling and maintaining vehicles should be able to prevent leakage (e.g. paved). - Maintain fuel and clean vehicles and equipment at workshops/sites with adequate leakage prevention (e.g. impermeable surface, settlers and oil separator). - Storing hydrocarbons and hazardous materials on impervious ground under cover and constructing the storage area as a spill tray to avoid spread of accidental spills.	Weekly	Throughout construction phase	Pollution within acceptable limits	Contractor (Implementation) ZEMA (enforcement)	Construction cost
Handling, Storage and disposal of Hazardous Materials	Impacts on workers' health	- Storing hydrocarbons and hazardous materials on impervious ground under cover and constructing the storage area as a spill tray to avoid spread of accidental spills. - Providing safe ventilation for storage of volatile chemicals. - Restricting and controlling access to areas containing hazardous substances. - Site all hot mix plant, crushing plant, workshops, depots, and temporary workers accommodation facilities in approved locations. - Using refrigerants and fire extinguishing agents in accordance with the 'Montreal Protocol'. - PPE for operatives. - Document safe disposal of hazardous or contaminated waste; including disposal sites and volumes. - Identify, in coordination with ZEMA as required, potential safe disposal sites for hazardous or contaminated waste. Investigate the environmental conditions of the disposal sites and prepare a recommendation for most suitable and safest site(s). - Designate disposal sites to be used in the project.	Daily	Throughout construction phase	Number awareness programmes conducted	Contractor (Implementation) ZEMA (enforcement)	20,000
Abstraction of water	Stress on water resources	- Pump amount in accordance to the water permit from WARMA - Work closely with WARMA - Ensure that only permitted amounts of water is pumped - Monitor the pumping of the water from the lake so that it is within standard.	Monthly	Throughout operation phase	Pump permitted amounts	VFU-CEL (Implementation) WARMA (Enforcement)	3000
Movement of heavy trucks, vehicles and machines	Injuries to pedestrians, increased road traffic accidents	- All motorists will be encouraged to move within the speed limit. Adequate signage will be installed along the roads within the project area - Entry into the project area will be restricted to workers only - Contractor will ensure that alternative spaces in communities will be provided for public vehicles to stop and pick-up passengers safely	Daily	Throughout construction	Incidents of accidents	Contractor (Implementation)	5000

Aspect	Impact	Mitigation/Enhancement Measure	Frequency of Monitoring	Time-Frame	Performance Indicator	Responsible Person	Cost (US\$)
Public consultation	All types of potential effects of the Project on the directly affected population. Knowledge about the Project by all interested parties.	Providing good and timely information on the project: - information on ongoing and planned works - receiving of and dealing with complaints by affected or interested public - public disclosure of relevant documents	Monthly and as when as the complaint occurs	Throughout construction	Number of consultation meetings held.	Contractor (Implementation)	8,000
Occupational Health and Safety	Work accidents, occupational diseases (skin irritation, noise, etc.)	- Develop occupational health and safety procedures such as wearing of protective equipment, proper handling of hazardous substances, etc. - All workers have to use the relevant protective equipment (helmet, gloves, goggles, work boots, masks, ear plugs, etc.), provided free of charge. - All restricted facilities have to be labelled with caution signs, especially those with potential risk for workers - All construction areas shall be marked and fenced to avoid accidents involving unauthorised people. Fence off all areas such as excavation pits, quarries, etc. to prevent accidents. - First aid kits and facilities need to be available at the construction site for fast action if an accident occurs. Workers should be provided with First Aid Training. - Accessible consultation sheets for review in case of contingency or emergency situations. These should have phone numbers for police, fire fighters, Red Cross, personnel supervisor or project leader. - Prepare a scheme of the evacuation routes and where the fire extinguishers are located within the plant and place them at conspicuous places. - Maintenance of machinery (preventive and corrective; during construction and operation). - Assign a special area for food consumption during construction. - Workshops and camp site must have	Daily	During construction and operation		Contractor (Implementation)	12,000
	Risk of Accidents	Contractor will adopt best transport safety practices (Journey Management Plans (JMPs)) with the goal of preventing traffic accidents and minimizing injuries suffered by project personnel and the public by: employing safe traffic control measures, including road signs and flagmen/traffic guides to warn of dangerous conditions and children crossings; and setting speed limits on all access roads in the project area will be 40km/h for light vehicles and 30 km/h for heavy vehicles. Through the JMPs, optimum routes from material storage areas to the construction sites will be identified to avoid sensitive receptors such as schools and hospitals.		Throughout construction	Journey management document	Contractor (Implementation)	20,000
Presence of the project in the area	Increased employment opportunities	- Workers will be employed locally, where possible, without discrimination of gender, race, religion, and for unskilled positions for low literate. - Avoiding conflicts with local communities by providing resources for worker requirements at works contractor's temporary operational sites. - Avoiding the potential spread of vector borne diseases and communicable diseases, such as STIs and HIV/AIDS by controlling the contact of workers with awareness programmes, and regulation. - Achieve 30% minimum target employment for women (including equal remuneration for similar work) jobs are targeted for women in order to promote and increase opportunities and participation for women during construction. - Opportunities will be for skilled, semi-skilled and unskilled positions	Monthly	Throughout construction	Number of locals employed	Contractor (Implementation)	Construction costs

Aspect	Impact	Mitigation/Enhancement Measure	Frequency of Monitoring	Time-Frame	Performance Indicator	Responsible Person	Cost (US\$)
	Enhanced business opportunities	Encourage workers to buy from locals' shops	N/a	N/a	N/a	N/a	N/a
	Changes in land use, i.e. from a natural area to tank sites in some areas. Establishment of new office blocks	- For mitigation measures regarding areas to be occupied temporarily or permanently by project structures and/or related activities, see entries for Vegetation - New facilities should be designed to be integrated in the landscape to the extent possible.	N/A	Throughout construction	Building within required standards	Throughout construction	10,000
Influx of workers to the area	Increased market for local goods	Encourage workers to buy from local people for goods and services that area available in the area	N/a	N/a	N/a	N/a	N/a
	Increased conflict between workers and locals	- Preparing workers to avoid conflict situations through orientation and awareness programmes. - Avoiding damage to utilities by ensuring that vehicles and equipment are operated by trained personnel, and that operations are adequately supervised. - Informing the affected community of the schedule if utilities have to be moved or services are interrupted.	Monthly	Throughout construction	N/a	Throughout construction	N/a
	Stress on public health facilities as there will be an influx of people looking for jobs	- Give first priority to local members of the community when employing - Support government programmes on health such as rehabilitation and construction of health facilities	N/a	N/a	N/a	N/a	N/a
	Spread of communicable diseases	- Health education on the dangers and prevention of communicable - Insert prevention intervention clauses in construction contracts. - Maximise employment of local labour for construction work. - Focus on behaviour change for workforce, not just raising awareness - Tailor messages to the general workforce, as well as men and women - Provide male and female condoms for construction workers. - Educate construction workers on how to avoid STI, to recognize common STI symptoms, and to seek treatment via confidential referral systems. - Publicize to workers the existence of anonymous VCT service (testing, pre-test, and post-test counselling). - Educate construction workers on how to avoid Opportunistic Infections, to recognize common Opportunistic Infections symptoms, and to seek treatment - The Construction Supervisor in collaboration with Ministry of Health shall take measures to educate and sensitise the labour force on the risks of communicable diseases (malaria, TBC, STDs, including HIV/AIDS etc.). How infections are transmitted, how to recognise symptoms, what should be done and on prevention measures. Male and female condoms shall be distributed to workers by the Contractor free of charge. - Overall good housekeeping contributes to maintain hygienic and safe conditions on the construction site.	regular intervals	throughout the construction period	Reduction in the spread of communicable diseases	Contractor (Implementation)	10,000

7.3 Management of End-of-Life Solar Panels

In addition to the mitigation measures outlined in Table 7-1 and 7-2, specific procedures will be implemented for the management of damaged or end-of-life solar photovoltaic (PV) modules to prevent environmental contamination and ensure compliance with applicable waste management regulations. Although solar panels are generally durable and have a design life of approximately 25 years or more, individual modules may require replacement during the operational phase due to damage, performance degradation, or defects. Damaged or decommissioned panels will be carefully removed by trained personnel. Broken modules will be handled with appropriate personal protective equipment (PPE) to prevent injury and potential exposure to internal components. For disposal, the project proponent will prioritise recycling through licensed and approved recycling facilities capable of recovering materials such as glass, aluminium frames, and semiconductor components. Where local recycling capacity is limited, arrangements will be made with regional or international certified recycling service providers in accordance with national waste management regulations and international best practice. Disposal at landfill will only be considered as a last resort and will be undertaken at an approved hazardous or controlled waste disposal facility, subject to regulatory approval. These measures will ensure that end-of-life solar panels are managed responsibly, minimising environmental risks and supporting circular economy principles.

7.4 Description of the ESMP

The Environmental and Social Management Plan (ESMP) provides an overall approach for managing and monitoring environment and social issues during construction and operation. It describes the institutional framework and resource allocations required to implement the environmental and social management and monitoring plans for the Project.

This Section of the ESMP Report presents the framework that will be developed for the Project and under which the Contractor will be required to operate.

7.5 Legal Framework

Section 2 of the ESIS Report provides a list of the relevant laws on protection of the environment, occupational health and safety.

Among the international standards for the solar PV project are the International Finance Corporation (IFC) Policy, and Performance Standards on Social and Environmental Sustainability and the IFC EHS Guidelines (see Section 2 of this Report). The following Table lists the topics which are covered by the IFC EHS Guidelines and the relevant Management Plans which will have to be implemented for solar PV project by the Owner and / or the Contractor(s).

Table 7-3: IFC EHS Guidelines which have been applied for the ESMP

General EHS Guidelines IFC	Management plans to be implemented (discrete plans for construction and operation periods)
1. Environmental	
1.1 Air Emissions and Ambient Air Quality	Air Quality Management Plan
1.2 Energy Conservation	
1.3 Wastewater and Ambient Water Quality	Wastewater Management Plan / Water Quality Monitoring
1.4 Water Conservation	
1.5 Hazardous Materials Management	Hazardous Material Management Plan, Explosives Management Plan

General EHS Guidelines IFC	Management plans to be implemented (discrete plans for construction and operation periods)
1.6 Waste Management	Waste Management Plan
1.7 Noise	Noise and Vibration Management Plan, Equipment Maintenance Management Plan, Explosives Management Plan
1.8 Contaminated Land	Pollutant Spill Contingency Plan, Site Rehabilitation Plan / Re-vegetation Plan
2. Occupational Health and Safety	Occupational Health and Safety Plan (OHSP)
2.1 General Facility Design and Operation	Site Maintenance and Housekeeping Plan as part of the OHSP
2.2 Communication and Training	Skills Development Plan, included in OHSP and other plans
2.3 Physical Hazards	Site Emergency Preparedness and Response Plan (included in OHSP), Explosives Management Plan
2.4 Chemical Hazards	Hazardous Material Management Plan, part of OHSP of the Contractor
2.5 Biological Hazards	Not applicable
2.6 Radiological Hazards	Not applicable
2.7 Personal Protective Equipment (PPE)	OHSP
2.8 Special Hazard Environments	OHSP
2.9 Monitoring	OHSP
3. Community Health and Safety	
3.1 Water Quality and Availability	Public Health, Water Quality Monitoring,
3.2 Structural Safety of Project Infrastructure	Included in OHSP and other plans
3.3 Life and Fire Safety (L&FS)	OHSP
3.4 Traffic Safety	Traffic Management Plan
3.5 Transport of Hazardous Materials	Hazardous Material Management Plan
3.6 Disease Prevention	OHSP
4. Construction and Decommissioning	
4.1 Environment	Additional Plans to the above mentioned are the: Erosion Control Plan Excavation Spoil / Fill Management Plan Site Rehabilitation Plan / Re-vegetation Plan
4.2 Occupational Health & Safety	See above
4.3 Community Health & Safety	See above

VFU-CEL (Project Owner)

VFU-CEL will be responsible for the following:

- Overall responsibility for environmental performance of the project;
- Decision-maker on applicable policies to the project;
- Oversight supervisory role during the construction phase;
- Overall responsibility for ESMP implementation during the operation phase;
- Review reports of independent environmental monitoring consultants;
- Approve changes to the ESMP, as necessary, as part of an adaptive approach to environmental and social management of the project;

- Shall appoint an Environmental Manager or Environmental Coordinator (ECO) to take care of environmental issues during Project implementation and a Safety Officer.
- Shall allow ZEMA Inspectors unrestricted entry to the project site at any reasonable time without making prior notice throughout the Project cycle.

The Contractor

The Contractor, i.e. the company in charge of constructing, will be selected and contracted by VFU-CEL.

The Contractor will have the overall responsibility for carrying out all the work on site, and for implementing the ESMP as far as applicable to the construction site and construction activities.

Specifically, with respect to ESMP implementation, the Contractor will have the following obligations:

- Preparation and implementation of the Environment, Health and Safety (EH&S) management and monitoring plans for construction site management;
- Responsible for training related to construction works and operating machinery/equipment;
- Design, construct, maintain and operate suitable temporary pollution control facilities, where appropriate, to prevent the discharge of polluting matter or visible suspended materials into private property, streams or existing drainage systems.
- Ensure that all construction personnel and subcontractors are informed of the intent of the ESMP and are made aware of the required measures for environmental and social compliance and performance;
- During construction, maintain traffic safety along access roads, with special emphasis on high trafficked areas;
- Preparation of a well-articulated Code of Conduct, accessible and understandable by every worker.
- Appoint officer(s) who will be responsible for the management of environmental issues on site. The Contractor's environmental officer(s) shall ensure the implementation of the ESMP guidelines, prepare Action Plans, maintain close liaison with the Employer's ECO and will have meetings regularly.
- Appoint safety officers who will be responsible for handling safety issues on site. The Contractor's Safety Officers shall ensure the preparation and implementation of the Occupational Health and Safety Plan (OHSP) and will maintain close liaison with the Employer's Safety Officer.

In order to be able to carry out these obligations, the Contractor will have its own Environment, Health and Safety (EH&S) Unit. This will, in addition to an experienced unit manager, have the required personnel and infrastructure (such as offices, laboratory, health facility, vehicles, computers, etc.) for executing the tasks. It is important that this EH&S Unit responds directly to the Construction Site Manager of the Contractor (as emphasised in Figure 7-1, and is not e.g. just a subunit of an engineering department).

The Contractor will also be responsible for the performance of its subcontractors. These will have to follow the overall ESMP as well as all the Sub-ESMPs.

Other Parties Involved

A number of government agencies will be involved in the Project, mainly by carrying out some regulatory and monitoring functions. The most important ones are shortly described Kazungula District Council, ZEMA, Forestry Department and Water Resource Management Authority (WARMA).

7.6 Monitoring

7.6.1 Internal Monitoring

For the EH&S measures to be implemented on site, the first level of monitoring has to be carried out directly by the Contractor. This is part of the duty of the personnel described in Section 7.3.1.

For an efficient monitoring of certain environmental parameters, e.g. for water quality, a number of measuring devices are required, which allow to make fast and precise measures on site at the required places and intervals. The Environmental Consultant proposes to use modern hand-held equipment for this purpose.

The supervision and monitoring of the Contractor's activities on a second level is the duty of VFU-CEL, as the Project Owner. This monitoring will be done by checking the regular monitoring reports to be provided by the Contractor, and by carrying out regular (unannounced) site visits. In practice, this work will be done by personnel stationed on site and/or by the Owner.

VFU-CEL will also be responsible for this type of monitoring for all mitigation measures not related to construction, and therefore not under the responsibility of the Contractor. This concerns, among some other points, the monitoring of the livelihood restoration plan implementation.

7.6.2 External Monitoring

External monitoring is usually required in such projects. This can be done e.g. by institutions (such as ZEMA) and/or external experts.

VFU-CEL and the Contractor respectively shall allow ZEMA inspectors unrestricted entry to the Project site at any reasonable time without making prior notice throughout the Project cycle.

7.6.3 Reporting

Reporting is essential. The following monitoring reports seem required for this project:

- “Standard” monthly, quarterly and yearly reports to be prepared by the contractor and the Owner's Engineer covering project advancement, but also containing information on implementation of all ESMP related activities, any problems encountered and corrective measures taken.
- All emergencies with potential to cause damage to the environment shall be reported to ZEMA within 24 hours.
- Any accident with serious consequences has to be reported to the site manager, and by him to VFU-CEL, immediately.

7.6.4 Contractual Measures

Implementation of the mitigation measures required by the subplans will generally be done by contractors.

In the pre-construction period, the subplans will be developed by VFU-CEL's EH&S Unit for implementation by the local contractors. VFU-CEL will review and approve any plans local contractors might have or develop during this period.

For the main construction periods, the subplans will be developed by the main contractor/consortium. For this it is important that the measures as described here shall be included in the international (and local, in the case of subcontractors) tender documents, and that the potential contractor will have to prepare their proposals taking into account these measures. It will also have to be stated clearly in the tender documents that the evaluation of tenders will include consideration of EH&S management staff and plans, and of past EH&S

performance, and that selection of the contractor will be based partly on these factors, including past EH&S performance. In particular, a poor performance record should be a reason for disqualification.

Likewise, the contract with the successful bidder should contain these environmental management measures as firm conditions to be complied with.

7.6.5 Sub-ESMPs

The ESMP is an umbrella plan that describes the management of EH&S matters to mitigate the impacts identified in the ESIA and that will be complemented and augmented by a number of subplans prepared by VFU-CEL's EH&S Unit, the main contractor/consortium, and/or subcontractors.

Subplans approved by the main contractor/consortium will be reviewed and approved by VFU-CEL's EH&S Unit and/or the Owner's representative, while those prepared by subcontractors will be reviewed and approved by the main contractor/consortium.

VFU-CEL will be committed to the creation and implementation of programmes to reduce the probability of occurrence of deleterious environmental incidents. Contingency plans will be developed for dealing with such adverse incidents, if they occur.

VFU-CEL will expect the same level of environmental performance from its contractors, sub-contractors and suppliers and needs to stipulate this in any legally binding agreements it enters with these parties (see Section 7.7.6.4).

VFU-CEL should include the following umbrella obligations into the contract of any main and sub-contractors:

"The Contractor shall take all responsible steps to protect the environment (both on and off the site) and to limit damage and nuisance to people and property resulting from pollution, noise and other results of his operation.

The Contractor shall ensure that emissions, surface discharge and effluents from the contractor's activities shall not exceed the values indicated in the Employer's requirements, and shall not exceed the values prescribed by applicable laws and good international practice, including the IFC EHS Guidelines, whichever is more stringent.

The Contractor shall take all responsible steps to ensure the occupational health and safety of its workforce as well as the security of the public (both on and off the site). The Contractor is obligated to equip its workforce with the required personal protective equipment, to supervise and to train its workforce related to international safety standards (ILO Standards, IFC Performance standards) and to report any incidents to the Client (VFU-CEL). In case of non-compliance, it can be considered as breach of contract.

The Contractor will have to include these conditions in all the contracts with his subcontractors, and he will be responsible for the compliance of the subcontractors with these conditions. VFU-CEL may inspect and monitor contractor's and subcontractors' EH&S compliance and performance at any time.

This Clause shall take precedence over all environmental-related clauses elsewhere in the Contract."

Furthermore, the Contractor will be under contractual obligation to VFU-CEL to implement the aspects of the ESMP and approved subplans that apply to it, and to ensure compliance by its own workers and its subcontractors. The Contractor will ensure that appropriate corporate resources, personnel and reporting and accountability systems are in place for the successful implementation of the ESMP and relevant subplans. They will, on a continuing basis, review the objectives of the ESMP and subplans as well as the company's success in achieving them. Where objectives are not being achieved, corrective action will be taken. Adjustment may be made to environmental mitigation measures as needed in order to reach compliance with ESMP objectives.

Each Sub-ESMP will have to include the following:

The purpose

Reference and relevant documents (Zambian legislation and other applicable international standards and other documents used)

Roles and responsibilities

The management process

- Emission standards and requirements
- The project emission sources
- Prevention and control

Surveillance

- Inspections
- Monitoring (measurements)
- Reporting

Actions to be taken in case of non-compliance

Awareness and training

Documentation and communication

Plans for construction, including both the pre-construction and main construction periods, will be similar, although responsibility for their development may be different. Similarly, plans for the initial operating period, which will be effective during the period before full operation, and the full operating period, will also be similar or identical.

Safety

Employers need to have a written safety policy for their enterprise setting out the safety and health standards that they aim to achieve. The policy should name the senior executive who is responsible for seeing that the standards are achieved, and who has authority to allocate responsibilities to management and supervisors at all levels and to see that they are carried out.

A risk assessment will have to be carried out to identify hazards and measures for the prevention of accidents. General principles have to be the conditioning and maintenance of the workplace (good housekeeping); the development of knowledge, experience and training of the work force at all levels, the coordination, organisation and management of the work force, duties and responsibilities of supervisors and key workers, that facilities and equipment are appropriate for the work to be performed and that they meet the health and safety standards. Furthermore, the policy needs to contain the selection and control of subcontractors and the arrangements for setting up safety committees. The following procedures will have to be developed:

Training and Capability of the Workforce

One of the most important measures at a construction site is the implementation of continuous training of the workforce, to raise awareness that personnel at all levels have a degree of responsibility in relation to environmental, health and safety issues. Therefore, it is necessary to implement induction training for each worker and a periodic repetition on general environmental, health and safety issues. In addition to the general EH&S training task, specific training modules need to be developed to train the workforce in relation to their specific activity. Documentation needs to be kept to verify that the workforce has been trained adequately.

Investigation of Accidents

All accidents as well as near misses need to be reported and investigated to be able to take corrective actions, to learn and finally to prevent future incidents.

Construction and Camp Site Management Plan

This plan will specify which facilities and installations need to be provided for the workers and on which level of standard, e.g. sufficient and well-maintained sanitary facilities, child-care facilities on site, proper lighting wherever and whenever work takes place.

Site Maintenance and Upkeep

The objective is to promote an efficient housekeeping management in all working and living places, in order to ensure fundamentally tidy conditions and the protection of all personnel health.

Safety procedures during construction works

These procedures should provide guidance in terms of excavation safety, fall protection (ladders, scaffolding), safe use of working tools and equipment (welding, cutting, working near water, etc.)

Personal Protective Equipment (PPE)

Standard PPE such as safety helmets, reflectors and appropriate footwear (safety shoes or boots) needs to be used on the whole construction site area, and by all persons on site. The need for other PPE (such as goggles, hearing protection, overalls, dust coats, gloves and masks) will depend on the type of work done by the employee. Furthermore, proper work clothes will provide skin protection.

It is the Contractor's obligation to provide the required PPE free of charge, and to enforce its use.

All visitors entering the construction site will be required to wear appropriate protective clothing.

Hazardous Material Management Plan

A Hazardous Materials Management Program (see also appendix 3, Data Sheet No. 9) will be prepared by the Contractor to comply with the relevant IFC EHS Guidelines. This will set out the methods for screening the characteristics and threshold quantities of hazardous materials, managing the risks associated with their transportation, storage, use and disposal, keeping safety data sheets at the place where hazardous material is used, stored and disposed of, specific training program for employees concerning H&S, and authorisation for people working with hazardous substances, and for informing the potentially affected community (if relevant). Important categories are the following:

Chemical Substances

Many chemicals are hazardous, with a potential for fire and explosion, or toxic, with an inherent potential to cause poisoning. Toxic substances cause both acute effects, such as dizziness, vomiting and headaches, produced in a short time by exposure to solvents, and chronic effects resulting from exposure over a long period as in lung diseases such as asbestosis and silicosis. Contact dermatitis may result from the contact between the skin and some chemicals. Acids and alkalis are corrosive and can damage both skin and eyes.

Cement

Cement mixes are a well-known cause of skin disease. Both irritant and allergic contact dermatitis can result from proximity to wet cement. Prolonged exposure to wet cement (for example, by kneeling or standing in it) may cause cement burns or ulceration of the skin.

Asbestos

Breathing in asbestos dust can kill by causing irreversible lung damage and cancer. There is no known cure for asbestos-related diseases. The more asbestos dust breathed in, the greater the risk to health. There are control limits for the various types of asbestos.

Today, asbestos is normally no longer used, and it is assumed that this material will also not be used on the construction site. The main problem today is often the rehabilitation or decommissioning of old structures, where asbestos was applied sometimes in large quantities; in such cases, it needs to be taken out and disposed of, whereby strict protection measures for workers have to be observed.

Fire Precautions

Fires on construction sites arise from the misuse of compressed gases and highly flammable liquids, from the ignition of waste material, wood shavings and plastic materials, and from the failure to recognise that adhesives and some floor and wall coatings are highly flammable (especially in relation to smoking).

The use of fires should be monitored and should be restricted to residential camps.

Every individual on site should be aware of the fire risk, and should know the precautions to prevent a fire and the action to be taken if fire does break out. Firefighting material (such as fire extinguishers, fire detectors, alarm systems) must be available on all sites for use whenever need arises.

Traffic Management Plan

The underlying cause of most site traffic accidents is the failure to plan a safe system of work and to train workers on how to follow it. However, the common immediate causes are one or a combination of the following factors:

- Bad driving techniques which include reversing blind;
- Poor maintenance of vehicles;
- Carelessness or ignorance of special hazards, e.g. overhead power lines or excavations;
- Carrying unauthorised passengers;
- Overloading or bad loading;
- Site congestion,
- Poor traffic layout;
- Lack of proper roadways combined with uneven ground and debris.

The Contractor will produce a Traffic Management Plan (TMP, based on Data Sheet No. 03) which needs to contain appropriate strategies for moving materials and persons to, from and within the construction areas, including abnormal loads. It will also contain provisions for management of connection points between site access roads and the main public roads, and for any upgrading work to be carried out. Specific traffic management measures will include, but not be limited to the following procedures:

- Only licensed and authorised persons should drive project vehicles, carrying of unauthorised passengers and cargo shall be prohibited,
- Compliance with all relevant applicable laws / traffic regulations;
- All visitors coming to the project site are required to abide by the traffic guidelines for the project;
- Parking and on-site traffic movement, when possible, switch off engines when not in use;
- Safe driving procedures (training, enforce use of safety belts, backwards driving signals, etc.);
- Training and testing of heavy equipment operators and drivers, including vision tests, with records kept of all trainings;
- The use of any kind of drugs needs to be forbidden and sanctioning needs to be included;
- Use of buses to transport workers to reduce traffic;
- Enforcement of maximum load restrictions;
- Posting and enforcement of speed limits;
- Road signs to highlight exits, crossings, warnings, etc.;

- Vehicle safety classes in the affected settlements for residents/villagers, in particular pedestrians and bicyclists.

The Traffic Management Plan will also specify the procedures for the monitoring and reporting of the construction-generated traffic movements, and associated environmental problems.

All proposals, details, execution, maintenance, removal and necessary reinstatement associated with safety and management, temporary decking, road crossings and other structures on public roads, shall be subject to the approval of the Roads Authority and as advised by the Site Manager or Safety Officer. The Contractor or his agent or supervisor shall supply all information required for consultation with appropriate authorities, including the Local Authority and the Police.

All traffic safety and management measures necessitated by the works shall be fully operational before the construction team commences work which affects a highway or gazetted road.

All accidents, however big or small, should be reported to the Safety Officer immediately according to the reporting format to be provided by the Safety Office.

7.6.6 Environmental Management Plans

General principles are to involve the relevant stakeholders in environmental education and awareness, to verify the compliance with national and international environmental regulations and standards, to strengthen the environmental awareness of the workforce through training and to reduce possible negative impacts by applying proper environmental procedures and practices. Responsible supervisors are in charge of the proper conduct of their workers, equipment and facilities. A positive attitude shall be developed concerning environmental procedures.

For this a set of Procedures/Sub-management Plans is proposed and described to some extent in the subsections below.

Solid Waste Management

Proper waste management (e.g. collecting, reuse, recycling, and disposal) has short and long term benefits to community health, quality of life and environmental protection. It also enables anticipation of associated problems and their mitigation. It is therefore essential to develop efficient management practices because of risks such as the following:

Uncontrolled burning of waste pollutes the atmosphere, produces poisonous gases and can cause injuries if e.g. pressurised empty cans explode.

Uncontrolled burying of waste can pollute the ground and surface water.

Uncollected piles of waste attract animals and insects which are harmful and can spread diseases. Sharp objects such as needles, broken glass and blades, and other dangerous (hazardous) waste might be present in waste piles and may harm human scavengers, in particular children, and animals. Piles of waste are unsightly, they emit odour and make people nearby feel uncomfortable generally reducing the aesthetic value of the environment. It also blocks drains, leading to flooding and blocked access routes.

Therefore, good practice in waste management is very important in order to avoid these risks to health and environment.

The objectives of a waste management system are to ensure a safe and clean living environment, protecting loss of life and property and ultimately mitigating adverse impacts on the natural environment. This is achieved

through systematic planning, implementation and monitoring of minimising, storing, collecting, recycling and disposal of refuse.

Solid waste can broadly be categorised into two groups namely hazardous waste and non-hazardous waste. On the other side, liquid waste can be categorised into two groups as domestic wastewater and industrial wastewater.

Hazardous waste which can be generated by industries (chemical/pharmaceutical, radioactive waste, heavy metals), hospitals/medical centres and other sources (e.g. sanitary waste incl. human excreta, pressurised containers) should be handled and disposed of by specialists who are specifically trained for that purpose. Normal waste collectors should however be trained to at least differentiate and/or identify hazardous waste and take steps to report them with urgency.

Management of Wastewater and Protection of Natural Streams

Wastewater means waste principally consisting of water, and includes washdown water, cooling water, effluent, irrigation runoff and contaminated storm water.

Wastewater management system means a system designed and operated for the purpose of collecting and managing wastewater so as to minimise any adverse impacts of the wastewater on the environment. Wastewater can be classified into two categories namely:

Domestic wastewater means wastewater from residential settlements and services which originates predominantly from the human metabolism and from household activities;

Industrial wastewater means any wastewater which is discharged from premises used for carrying on any trade or industry, other than domestic wastewater and runoff rain water;

Any type of wastewater should be subject to a treatment process before it is discharged to the environment. The treatment process is identified according to the content of the wastewater. At the construction site, three main types of wastewater are generated. These are domestic wastewater, wastewater generated from concrete batching works and wastewater generated by aggregate washing. Besides that, there are other sources of wastewater to be expected, e.g. water from maintenance (washing) of machines and vehicles.

Key elements of wastewater treatment:

Pre-treatment is the removal of sand and fat using mechanical processes such as screening, sedimentation or flotation

Primary treatment is the removal of suspended solids by passing wastewater through a settlement process in flotation tanks

Secondary treatment is a biological treatment.

Tertiary (more advanced treatment) involves removal of phosphorus and nitrogen.

Air Quality Management

The Contractor will produce an Air Quality Management Plan. Air quality and equipment maintenance are strongly related. Good equipment maintenance will prevent high emissions (see section "Equipment Maintenance Management" below). Furthermore, procedures such as road sprinkling, energy efficient driving training, good housekeeping, etc., need to be implemented. Daily inspections and instrumental monitoring outside of the construction site will have to be carried out.

Confined spaces (tunnels, workshops, caverns etc.) will need special attention and mechanisms will be implemented to guarantee good ventilation.

Noise and Vibration

Excessive exposure to loud noise can cause permanent damage to hearing. Hearing protection will be required for work in especially noisy places, e.g. crushing plants. Machines, including vehicles, will have to be maintained in order to stay within legal noise limits. This will have to be monitored.

Erosion Control

The Contractor will develop procedures to minimise erosion caused by construction activities. Sensitive areas need to be identified, and avoided if possible. If work has to be carried out in such sensitive places, state of the art techniques has to be used to reduce erosion were possible (implement drainage channels, slope properly, compact, if necessary, stabilise, start re-cultivation as soon as possible). Areas sensible to erosion should be monitored.

Pollutant Spill Contingency Plan

The Contractor's Pollutant Spill Contingency Plan, will outline the procedures for proper handling of potential pollutants and procedures to be carried out in the event of a pollutant spill. It will also specify equipment procurement and training of construction personnel. The most important pollution mitigation measures are shown below:

Prohibition of dumping of any contaminating substances into the environment (including oil, waste oils).

Storage and routine handling of fuels, lubricants, and other contaminating substances in workshops with sealed floor and equipped with a drainage system with oil skimmer.

Storage areas shall be designed such that they will contain 110% of the largest container/vessel stored in the storage area; suitable clean-up equipment and material need to be on site.

All wastes recovered during cleanup operations to be collected and stored for subsequent disposal.

Supply agreement will include responsibility for supplier to take waste oil,

The Contractor will verify that each supply/disposal subcontractor has adequate arrangements or facilities for proper disposal, treatment or recycling of these wastes.

Personnel will be educated on proper use and disposal of hazardous materials.

Equipment Maintenance Management

The Contractor will produce an Equipment Maintenance Management Plan which needs to contain the processes for the maintenance of the different construction equipment used on-site and off-site, maintenance protocols should be developed for the different equipment, machine and vehicle types, the periodicity in which the maintenance inspections need to be carried out for the different equipment, machines and vehicles types needs to be determined. Furthermore, the Contractor will set up procedures to take worn out or unsafe equipment out of operation until it has been repaired and is in compliance with safety and environmentally acceptable standards. All maintenance protocols need to be kept on the construction site.

As far as practicable, the Contractor shall bring to site, and employ on the works, plant and equipment that is environmentally acceptable with safe and tolerable sound emission compatible with the safe and efficient undertaking of the works.

All plants shall be properly maintained and relevant service records kept. All plants shall be provided with effective silencers and anti-vibration devices, and shall be operated according to the manufacturer's recommendations, in such a manner as to avoid causing excessive noise emissions or vibrations.

8 DECOMMISSIONING AND REHABILITATION PLAN

The goal of decommissioning is to ensure that the project sites are left in a condition that is safe and stable, long-term environmental impacts are minimised and any future liability to the community and future land use restrictions are minimised. Several factors usually drive the process. The Decommissioning and Closure Plan shall be subjected to periodic review to update it with any possible change of business plans. The proposed closure cost estimates (stated in section 8.5) were based on the current market prices and costs of labour. These shall be updated with annual inflation and major economic changes.

8.1 Closure and Rehabilitation Objectives

Given the fact that the Kazungula Solar PV project will be for a long time, the rehabilitation and closure objectives for this project will be as follows:

1. Compliance with relevant Zambian environmental legislation relating to close of such projects.
2. Identification of potential post closure uses of the land occupied by certain infrastructure in consultation with government authorities and land users;
3. Rehabilitation of disturbed land to a state that is suitable for its agreed post closure uses;
4. Rehabilitation of disturbed lands where temporal structures will be built:
 - Ensures that the area is physically stable and minimizes safety hazards;
 - Minimizes the opportunities for soil erosion to occur;
 - Facilitates compliance with applicable environmental quality objectives (air quality and water quality guidelines);
 - Reduces visual impact of the disturbed land;
 - Provides a self-sustaining solution with a minimum of post closure management.
5. Finding alternative livelihood strategies for workers whose jobs become redundant upon completion of construction and at closure;
6. Keeping relevant authorities informed of the progress of the decommissioning phase;
7. Submitting monitoring data to the relevant authorities as required;
8. Maintaining required pollution control facilities and rehabilitated land until and/or after closure.

8.2 Post-Closure Land Use

The project will identify potential post closure uses of the land occupied by the project infrastructure in consultation with government authorities, the surrounding landowners and land users. Generally, the contractor will ensure that the whole site is also subjected to progressive rehabilitation so that all areas where construction is completed are rehabilitated.

8.3 Post - Closure Monitoring

Surface and groundwater monitoring will continue until such time as it can be demonstrated that residual impacts have been reduced to an acceptable level. At least monitoring shall be conducted for whole period the project will be in operation. Following the completion of the rehabilitation programme monthly inspections will be carried out for a certain period of time especially around the areas that were directly affected by the project.

8.4 Post - Closure Maintenance

Any flaws identified during the post closure monitoring phase will be addressed by the post closure maintenance programme-by the project management;

Monitoring and maintenance will continue until a closure certificate has been issued by the authorities.

8.5 Cost of Decommissioning

The expected expenditure for the decommissioning and closure works is composed of costs for demolition and cleaning the site. It is expected that the cost of decommissioning will be about 20% of the project cost.

8.6 Validation of Decommissioning

At the completion of the decommission phase, VFU-CEL will produce a validation report to show that the decommissioning plan has been successfully implemented by confirming that there is no risk of environmental pollution and negative social impacts. The report will include the following:

- Disposal of raw materials;
- Disposal of waste;
- Decommissioning of plant and equipment;
- Disposal of obsolete equipment;
- Results of monitoring and testing; and
- The need for ongoing monitoring or investigations.

Table 8-1 summarises the decommissioning and closure impacts and their associated mitigation measures.

Table 7-4: Summary of Decommissioning and Closure Activities

Environmental Comp.	Impact	Mitigation/Enhancement Measures	Frequency of monitoring	Performance Indicator	Responsible Person/ Entity
Biophysical Environment	Land degradation from disposal of decommissioning waste	Establish waste management priorities at the outset of activities based on an understanding of potential Environmental, Health, and Safety (EHS) risks and impacts and considering waste generation and its consequences	Weekly	Amount of accumulating waste	VFU-CEL
		Establish a waste management hierarchy that considers prevention, reduction, reuse, recovery, recycling, removal and finally disposal according to ZEMA guidelines		Availability of a waste Management strategy	
		Preventing uncontrolled releases of hazardous materials to the environment or uncontrolled reactions that might result in fire or explosion			
		Provide education to workforce on hygienic conditions and behaviours	Daily	Amounts of solid waste disposed of	
	Pollution of Water resources	All solid waste (screenings) shall be adequately dried before disposal at a disposal site			VFU-CEL
		Apply measures on Land degradation from disposal of decommissioning waste	Daily	Air Quality	
	Air pollution	For open area sources, including storage piles, use control measures such as installing enclosures and covers, and increasing the moisture content	Daily		
		Implement dust suppression techniques	Daily		
		Avoid open air burning of solid waste			
	Noise and vibration	Plan activities in consultation with local communities so that activities with the greatest potential to generate noise are planned during holidays and off-peak periods of the day	Weekly	Noise levels Vehicle and machinery Maintenance records	
		Use noise control devices, such as temporary noise barriers and deflectors for impact and blasting activities, exhaust muffling devices for combustion engines including generators	Daily	Records and verifications from communities	
		Avoid or minimise project transportation through community areas	Daily	Records of damages	
		All workers involved in noisy works will be provided with Personal Protection Equipment (PPE)	Daily	Records of damages	
		Where decommissioning activities result in damage, repairs/ restructure will be provided	Weekly	Records of repairs	

Environmental Comp.	Impact	Mitigation/Enhancement Measures	Frequency of monitoring	Performance Indicator	Responsible Person/ Entity
Socioeconomic Environment	Employment Creation	Prioritise employment opportunities to local community members and only outsourcing where labour is not locally available. This could be achieved if the contractor works with the local authorities	Weekly	No. of locals, women and vulnerable people employed on project	Contractor
		Women and the vulnerable groups like widows should be given preference;	Weekly		
		Ensure expectations are well managed and avoid strikes	Weekly		
		Manage community relations well	Weekly		
	Damage and disruption to adjacent services	Obtain up-to-date information on the locations of services that can be disturbed or damaged when works are being implemented	Weekly	Damages to infrastructure	
		Give notice to the owner of power and telecommunication cables, or other installations likely to be affected	Weekly	Notices to service providers	
		Exercise care not to damage or disrupt these services Daily	Daily	Communication impending disruptions	
		Where the above is not possible, the contractor shall liaise with the concerned authorities so that adequate measures to cushion the impact are put in place Daily	Daily	Communication impending disruptions	
		Informing customers of impending disruptions through media	Daily	Communication impending disruptions	
		Where services are disrupted, service providers shall make sure such disruptions are for the shortest possible time. This will be through adequate communication by the contractor with service providers	Daily		
	Economic displacement	All people to be affected by decommissioning will be informed about the planned activities in advance. They will also be informed about the plans for repairing the damages	Weekly	Records of meetings with PAPs; Records of Notices to PAPs	
		Where the project will result in economic displacement, repair / restructure of livelihood will be provided.	Weekly	Records of restructure / repair	
	Occupational Health and Safety Considerations during Decommissioning of the Solar PV Plant	Train workers in lifting and materials handling techniques and placement of weight	Monthly	Incidences of overexertion, injuries and illnesses Training reports	
		Plan work site layout to minimise the need for manual transfer of heavy loads	Weekly	Appropriateness of site layout, tools and work stations	

Environmental Comp.	Impact	Mitigation/Enhancement Measures	Frequency of monitoring	Performance Indicator	Responsible Person/ Entity
		Implement administrative controls into work processes such as job rotations, rest and stretch breaks	Daily	Record of administrative controls	Contractor
		Implement good house-keeping practices e.g., sorting and placing of loose decommissioning materials in established areas away from foot paths	Daily	Slips and falls	
		Clean up excessive waste debris and liquid spills regularly	Daily	Records of good house-keeping	
		Plan and segregate the location of vehicle traffic, machine operation, and walking areas, use of one-way traffic routes, establishment of speed limits, and onsite trained flag-people wearing high-visibility vests or outer clothing covering	Weekly	Accidents Appropriateness of site layout and safety measures	
	Community Health and Safety Impacts Associated with the Decommissioning of the Proposed Solar Photovoltaic (PV) Power Plant.	Restrict access to the site, through a combination of institutional and administrative controls including fencing and signage	Weekly	Accidents involving community members	VFU-CEL
		Remove hazardous conditions on decommissioning sites that cannot be controlled affectively with site access restrictions	Daily	Evidence of access restriction and no hazardous conditions	
		Notice will be given, in writing, to the local authority of the works to be undertaken including the required time to complete the works	Weekly	Accidents Records of notice	Contractor
		Fence, guard and light, during the night, the works at all times while the street is opened or broken up or obstructed	Daily	Evidence of fencing, lighting, road restoration and no decommissioning waste	
		Where it is anticipated that decommissioning works will disrupt movement, the contractor in liaison with the Kazungula District Council will inform the public through the media at least 24hours before commencement of such works	Daily	Records of early warning to public	
		In peri-urban areas, the contractors shall also coordinate with the WDCs so that announcements are conveyed by word-of-mouth (i.e. announcements in clubs, churches, mosques, schools and other public gatherings) and also through the use of megaphones	Daily	Displayed notices Evidence of alternative routes, warning signs, fencing, lighting, road restoration and no decommissioning waste	
		Excavations will be sufficiently fenced with adequate warning signs and reflective tapes warning passers-by about deep trenches	Daily		

9 CONCLUSION AND RECOMMENATIONS

9.1 Conclusion

The Environmental and Social Impact Assessment (ESIA) study objectively assessed and evaluated impacts that may arise due to the proposed Solar PV project. The drafting of this ESIS was based on the design information on the project, which was provided by the design team who worked in conjunction with the ESIA team. The Mitigation measures and the Environmental Management and Monitoring Plan were formulated based on the level of detail and depth of the available information. In-depth analysis of the impacts revealed the following key findings:

Environmental Impacts

- Land Use Change: Conversion of partially disturbed land to solar PV facility.
- Vegetation Loss: Clearing of vegetation within the project footprint; low ecological significance if species are common.
- Soil Erosion: Exposed soil during construction may be susceptible to erosion, mitigated with sediment control.
- Surface and Groundwater Pollution: Minor risk from machinery fuels, lubricants, and maintenance chemicals.
- Hazardous Waste Generation: Limited amounts from used oils, batteries, and damaged panels.
- Noise and Air Quality: Temporary increase during construction due to machinery and transport; minimal during operation.
- Climate Change Benefits: Reduction in greenhouse gas emissions through renewable energy generation.

Socio-Economic Impacts

- Employment Opportunities: Short-term construction jobs and limited long-term operation jobs.
- As all project activities will be confined within the boundary of the site, no involuntary displacement and relocation of communities is envisaged;
- Energy Supply: Contribution to reliable and clean electricity to the national grid.
- Traffic and Safety: Increased vehicle movement during construction; minimal during operation.

Positive Impacts

- Sustainable Development: Supports national renewable energy targets.
- Environmental Benefits: Reduced reliance on fossil fuels, lowering carbon emissions.

Residual Impacts

- After applying mitigation measures (e.g., erosion control, spill management, proper waste disposal), most negative impacts are low to moderate in significance and temporary.

General Recommendations

Occupational safety and Health: Ensure that workers' occupational health and safety standards are maintained through capacity building, proper training, providing protection, clothing, and managing their camps to the required health standards.

Environmental audits and monitoring: Regular environmental audits should be carried out on the project in order to ensure compliance of the project with the mitigation measures outlined in the Environmental and Social Management Plan (ESMP).

Waste Management: Proper segregation, storage, and disposal of hazardous and non-hazardous waste, including damaged solar panels, batteries, oils, and chemicals. Recycling should be prioritized where possible.

Traffic and Access Management: Control construction vehicle movement to reduce congestion, accidents, and land damage. Clearly mark access routes.

Community Health and Safety: Prevent unauthorized access to the site and maintain open communication with nearby communities regarding construction schedules, hazards, and safety measures.

Biodiversity and Vegetation Management: Protect remaining natural vegetation and wildlife habitats. Rehabilitate cleared areas after construction through replanting or groundcover.

Water Management: Implement stormwater and erosion control measures to prevent runoff and contamination of nearby rivers, streams, or wetlands.

Noise and Air Quality Management: Limit construction noise and dust through scheduling, dust suppression, and proper machinery maintenance.

Emergency Preparedness and Response: Develop and maintain emergency plans for accidents, fires, chemical spills, or extreme weather events.

Training and Capacity Building: Provide regular environmental awareness and safety training for all workers, including site induction for new staff.

Decommissioning and Site Rehabilitation: Plan for the removal of project structures and restoration of the site at the end of the facility's operational life.

10 DECLARATION OF AUTHENTICITY OF THE REPORT

I hereby affirm that the information contained in this report regarding the proposed Kazungula Solar PV project by Victoria Falls University Clean Energy Limited is accurate and complete to the best of my knowledge.

Dimakatso Machetele
Project Developer

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APPENDICES

Appendix 1: Company Certificate of Incorporation



Patents and Companies Registration Agency
Computer Printout - Local Company



Local Company	VICTORIA FALLS UNIVERSITY OF TECHNOLOGY LIMITED	Registration Number	120020050806
Date of Incorporation	02 day of October 2002	Date of FY End	02/10/2025
Registered Office	P.O. BOX 36927, LUSAKA ZAMBIA		
Postal Address	P.O BOX 60247, LIVINGSTONE ZAMBIA		
Town / City	LIVINGSTONE		
Country	ZAMBIA		
Certificate Signed By	B A KATEBE		
Phone	+260977487944		
Email	watsonsikakonz@gmail.com		
Struck off/Ceased on			
Nominal capital	K 20000		
Liability	Ordinary Company		
Articles Filed Date			
Amended Articles Filed Date	11/01/2019		
Adopted Articles Filed Date			
Company Liquidated Date			
Company in Receivership Date			
Date Of Pre-deregistration			
Date Of Initial Gazette Notice			

* - Information in this report can change any time.

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Winding Up Resolution Date
Notice to commence Business
Rescue Proceedings Date
Business Rescue Date
Business Rescue Plan Filing
Date

Nature of Business

Sector
8530. Higher education

Annual return

Year	Date Delivered
2024	07/08/2025
2023	07/08/2025
2022	13/06/2023
2021	28/02/2022
2020	18/08/2021
2019	31/12/2019
2018	15/02/2019
2017	15/02/2019
2016	23/03/2017
2015	23/03/2017
2014	22/04/2015
2013	03/10/2012
2012	02/10/2012
2010	15/09/2011
2009	18/07/2010

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2008	18/07/2010
2007	18/07/2010
2006	16/07/2010
2005	14/08/2009
2004	14/08/2009
2003	14/08/2009

Class of Shares	Number authorised	Par value Per share
Ordinary	20,000.00	1.000

Individuals

Present forenames and surnames	Nationality	Identity Type	Identity Number	Director / Partner	Secretary	Shareholder / Member	Amount	Share Class
EDWIN RAISI TEMBO	ZAMBIAN	National ID	179020/53/1			Yes	75.00	Ordinary
MICHAEL M. LUBASI	ZAMBIA	National ID	108564/21/1			Yes	225.00	Ordinary
ANNIE KABUKABU SILUMESII WILLYBIRO	ZAMBIAN	National ID	264079/11/1	Yes		Yes	750.00	Ordinary
LITIA NYAYWA	ZAMBIA	National ID	164542/83/1			Yes	450.00	Ordinary
GETRUDE MWANGALA AKAPELWA	ZAMBIA	National ID	000060/06/1	Yes		Yes	6,102.00	Ordinary
NALISHUWA KAYUNYI	ZAMBIAN	National ID	175300/84/1			Yes	75.00	Ordinary
SHULLER HABEENZU	ZAMBIA	National ID	155636/73/1	Yes		Yes	600.00	Ordinary
WILLIE AUBBIE MUBANGA	ZAMBIA	National ID	118363/46/1	Yes				

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VINCENT AKA EHUENI	COTE D IVORE	National ID		Yes		Yes	450.00	Ordinary
JORRY MUYETWA MWENECHANYA	ZAMBIAN	National ID	197210/67/1	Yes	Yes	Yes	1,050.00	Ordinary
ELEANOR STELLA M. KAABWE	ZAMBIA	National ID	127443/73/1			Yes	948.00	Ordinary
MWENDABAI LIUWA	ZAMBIA	National ID	0176907/84/1			Yes	75.00	Ordinary
SHAMITIBA BETTS KANYANGA	ZAMBIA	National ID	127717/76/1			Yes	2,512.00	Ordinary
LEONARD HACILENGE	ZAMBIA	National ID	126929/11/1			Yes	75.00	Ordinary
LINGSON NDHLOVU	ZAMBIA	National ID	201546/53/1			Yes	113.00	Ordinary
DARIUS HICHILO HAKAYOBE	ZAMBIA			Yes		Yes	600.00	Ordinary
MWIYA MANGINDA	ZAMBIA	National ID	169540/84/1			Yes	300.00	Ordinary
RICHARD NSOFU MANDONA	ZAMBIA	National ID	108363/47/1	Yes				

Business Entities

Business Number	Name of Business	Secretary	Shareholder / Member	Amount	Share Class
120010046946	PERMANENT PROPERTIES LIMITED		Yes	600.00	Ordinary

Individual Beneficial Owners

Artificial Beneficial Owners

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Appendix 2: Proof of Public Consultation

Appendix 2A: List of stakeholders consulted

NO.	NAME	ORGANISATION	POSITION	Gender	CONTACT NO.	EMAIL
1	Jackline Shamanga	Environment Africa	Project Officer	Female	0967798071	shamangas@gmail.com
2	Stanley Chibunde	Environment Africa	Skill Manger	Male	0972461593	chibundestanley@gmail.com
3	Prince Bulanda			Male	0776500011	
4	Matildah Mabuku		Nurse	Female	0977625254	
5	Benson Cheelo	O. I	Attendant	Male	0767093330	Chelobenson7@gmail.com
6	Mrs. Makeshe	King Albert Teacher	Teacher	Female	0978456117	
7	Geshem Ndlovu	Oasis	Salesman	Male	0971922630	geshomndlovu@gmail.com
8	Naomi Nyirongo			Female	0978022246	
9	M. Katukula		Farmer	Male	0573304696	
10	P. Moonga	DEBS/KAZ	Acting Assistant	Male	0972650109	
11	Enerst Kamanga	DEBS/PSO	Procurement Officer	Male	0772398505	earnestmkamanga@gmail.com
12	Emmanuel Banda	DEBS/KAZ	ICT Officer	Male	0978487993	emmanuelmichaelbanda@gmail.com
13	Sifanu Nyamazana	MWDS/DWRD	DWDO	Male	0976623480	nyamazanasifunlubinda@yahoo.com
14	Akapelwa Muhau	MITHUD	TGW	Male	0974274976	akapelwamuhau@gmail.com
15	Maxwell Kazumba	District Administration	DA	Male	0979578549	maxwellkazumba@gmail.com
16	Crytone Likando	National Assembly	A. A	Male	0974115664	lorytone7@gmail.com
17	Hastings Mweete	MFL - KAZ	L.T	Male	0973292444	hastingsmwete23@gmail.com
18	Isaiah Chilenga	SWSC	B.M	Male	0976550568	chilenga13@gmail.com
19	Priscar Musokoli	DEC	I.O	Female	0977816465	priscarmusokoli@gmail.com
20	Mbeha Akabondo	DICT Administration	DAO	Male	0979152768	akambelo@gmail.com
21	Musenge Museme	Z. P	CIO	Male	0972078777	musenge700@gmail.com
22	Nchimunya Siantanga	KTC	DACA	Male	0978711942	siantangan@gmail.com
23	Isaac C. Kumwenda	DF	DFO	Male	0974547188	kumwendaisaac.ink@gmail.com
24	• Lubinda	KTC	CACO	Male	0975181711	akajonies09@gmail.com
25	Kapapa. Muke	District Administration	AAO	Male	0978456083	mukekapapa@gmail.com
26	Pamela Machila	DMMU	DDMO	Female	0975665051	pamelamachila@gmail.com
27	Festus Banda	Education	BIO	Male	0977621255	festusbanda@yahoo.com
28	Chafu Musonda	DF	Technician	Female	0961513535	chafumusonda97@gmail.com
29	Wakumelo Sitali	ZANIS	ADINO	Male	0979062400	wakumelositali@gmail.com
30	Bodwine Mulonga	SW	SWO	Male	0972801372	

Appendix 2B: Courtesy calls and interviews

	Date	Meeting	Present/Position	Remarks
1	January 13, 2026 at 09H30, Tuesday	Meeting with Acting DC – DAOs Office Kazungula District	• Akabondo Mbeha – District Administration Officer, Kazungula District • Robby Kasubika - KEGS- ESIA Consultant (Team Leader) • Kayula Chisela- KEGS- Consultant • Janet Chikololo- KEGS- Consultant • Isaac Kumwenda- District Forest Officer	The ESIA consultant explained that they were in the district to conduct stakeholder consultation meetings for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). They briefly outlined the project details and noted that the development would include a 600 m transmission line from the solar plant to Kazungula ZESCO sub-station. The team emphasized the role of the DC's office and other stakeholders in the District. They encouraged the institution's representatives to attend the meeting to help clarify key issues for stakeholders. The DAO assured the team that the District Administration is in full support of the project and encouraged the team to feel free to work and consult his office anytime for any assistance that they may need.
2	January 13, 2026 at 10H00, Tuesday	Meeting with the acting Council secretary, Kazungula District	a) A. Lubinda-CACO, Kazungula Town Council b) Robby Kasubika - KEGS- ESIA Consultant (Team Leader) c) Janet Chikololo- KEGS- Consultant d) Isaac Kumwenda- District Forest Officer	The consulting team briefed the acting Council Secretary on the purpose of the visit. They informed him that they were in the district to undertake Stakeholder consultation meetings for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). The acting Council Secretary informed the consulting team that the project is welcome and encouraged them to speed up the implementation of the project.
3	January 13, 2026 at 10H40, Tuesday	Public/Stakeholders Meeting, Council Chamber, Kazungula District	Developer, ESIA Consultants, Government Heads of Department, and broad-based public	Project details and ESIA process was presented. Stakeholders were afforded opportunity to air their concerns and ask questions (details see minutes appendix 2)

	Date	Meeting	Present/Position	Remarks
4	January 13, 2026 at 14H00, Tuesday	Meeting with District Forest Officer, District Forestry Office, Kazungula	- Isaac Kumwenda- District Forest Officer - Robby Kasubika - KEGS- ESIA Consultant (Team Leader) - Kayula Chisela- KEGS- Consultant - Regina Katebe- KEGS- Consultant - Chefu Musonda - Forest Technician Kazungula District	The ESIA team explained that they were in the district to conduct an ESIA stakeholder consultation meeting for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). They briefly outlined the project details and noted that the development would include a 600 m transmission line from the solar plant to Kazungula ZESCO sub-station. The team emphasized the role of the District Forest Office and other stakeholders in the district. The DFO expressed his appreciation for the team's visit to the Forest District Office and assured them that the institution was ready to provide support where needed. He advised the team that in order to remove the trees from the site to pave way for construction, the developer is required to pay for the forest inventory and value of the forest that will be removed. The payment should be made in full in order for the forest department to undertake the forest inventory to determine the value of the trees that will be affected. The consultant informed the DFO that the developer will be informed as guided.
5	January 13, 2026 at 15H00, Tuesday	Meeting with the Acting District Planning Officer, DACA Kazungula District	Nchimunya Siantanga -DACA Kazungula Town Council, Kazungula Robby Kasubika - KEGS- ESIA Consultant (Team Leader) Kayula Chisela- KEGS- Consultant Janet Chikololo- KEGS- Consultant Regina Katebe- KEGS- Consultant	The ESIA team explained that they were in the district to conduct an ESIA for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). The consultant inquired whether there was need to change Land Use from agriculture to Solar Use. The planner guided that there was no need to change Land Use, since the land in question is under commercial. He stated that the developer needs to submit construction/building permit. He was quick to mention that the submission of the designs should be done as quickly as possible before, within the first quatere of 2026. This will give the local authority time to review and approve the designs before the dissolution of Council in May 2026 in view of the upcoming general elections. He also mentioned that property rates have not been paid for some time and that a small fee is required to paid to the Local authority. As regards the issue of payment of property rates, the consultant assured the planner that they were going to inform the University.

	Date	Meeting	Present/Position	Remarks
6	January 15, 2026 at 08H30 Thursday	Meeting with Inspectors from ZEMA Regional Office, Livingstone.	- Lubasi Kagiso, Inspector, ZEMA Regional Office Livingstone. - Elijah Kajila, Inspector, ZEMA Regional Office Livingstone. - Robby Kasubika - KEGS- ESIA Consultant (Team Leader) - Kayula Chisela- KEGS- Consultant - Janet Chikololo- KEGS- Consultant	The ESIA team explained that they were visiting the Regional Office, to seek guidance on how to proceed the preparation of the ESIA for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). The ESIA team leader also outlined the details of the proposed project. The inspectors highlighted the following aspects to be considered during the ESIA process: - On which schedule (either First Schedule or Second Schedule) on which the said project falls. - Is land on title or what is the current status of the land where the solar plant will be established - What facilities will be installed on the site apart from the solar panels - What sensitive environments are within or near the site (e.g. water bodies, settlements, national parks, forest reserves) - How long will be the transmission line and will it pass through private properties? - How many boreholes will be on site and in an event, there are situated outside the site, may be there will be need to prepare an ESIA The consulting team thanked the inspectors for the guidance and stated that the developer has considered some of the issues raised for example, land is on title, the project falls on First Schedule (therefore an ESIA is required), some facilities that will be on site apart from solar panels, will include: offices, access roads, perimeter fence to mention but a few.
7	January 15, 2026 at 09H00 Thursday	Meeting with Area Warden – Department of National Parks and Wildlife, Livingstone	- Alex Situmbeko, Area Warden, Department of National Parks and Wildlife, Livingstone Office. - Robby Kasubika - KEGS- ESIA Consultant (Team Leader) - Kayula Chisela- KEGS- Consultant - Janet Chikololo- KEGS- Consultant - Leila Chingombe – KEGS - Consultant	The ESIA team explained that they were in the district to conduct an ESIA for the proposed construction of a Solar Plant to be located near Kazungula Central Business District (CBD). The team informed the Area Warden that they were visiting the DNPW offices to just seek guidance on how they can take into account the issue of wildlife in the area. Also, they enquired from the Area Warden what they need to do to ensure that the project does not adversely impact on movement of wildlife in the area. The Area Warden expressed his appreciation for the team's visit to his office and assured them that his office welcomed them in the region and was ready to provide support where needed. He stated that the solar plant will need proper fencing to prevent animals such as elephants from accessing the area. He also stated that all communities around will need to be sensitised about the project so that they are aware.

	Date	Meeting	Present/Position	Remarks
8	January 14, 2026 at 11H00 Thursday	Interview, Environment Africa, Kazungula District	Interviewer -Leila Chingombe KEGS Consultant Interviewee-Jaqueline Shamango - Project Officer and Stainley Chibonde - Skill Manager Environment Africa	<i>What are the main economic activities in this area?</i> The interviewee stated that the most common activity in the area is charcoal production. <i>What could be the main effect of the solar plant project on your operation?</i> The respondent stated that the project will have a positive effect in the area, as environment Africa green energy initiatives are highly supported and solar energy will contribute to environmental protection through the use of renewable energy <i>Do you have any concern over the construction of the solar project?</i> The respondent expressed concerns on land degradation and the disturbance of the ecosystem in the area <i>Do you support the project? Why?</i> The project is welcomed because over time the challenges of loadshedding will be reduced.
9	January 14, 2026 at 11H30 Thursday	Interview, Community Member (Near project site), Kazungula District	Interviewer- Leila Chingombe – KEGS - Consultant Interviewee - Prince Bilanda Resident (Near project site) Kazungula District	<i>What are the main economic activities in this area?</i> Only charcoal burning and firewood is mostly done in the area <i>What could be the main effect of the solar plant project on your operation?</i> The respondent stated that the people that produce charcoal and collect firewood from the area will have to find another place to operate from <i>Do you have any concern over the construction of the solar project?</i> No concern mentioned <i>Do you support the project? Why?</i> The respondent is in support of the project
10	January 14, 2026 at 11H45 Thursday	Interview, Community Member (Near project site), Kazungula District	Interviewer - Gina Katebe - KEGS - Consultant Interviewee- Matildah Ambuku Resident (Near project site) Kazungula District	<i>What are the main economic activities in this area?</i> Farming <i>What could be the main effect of the solar plant project on your operation?</i> Positive effect could be that the project would bring in employment amongst the youths around the area <i>Do you have any concern over the construction of the solar project?</i> No concerns <i>Do you support the project? Why?</i> The project is highly supported because it will bring development to the area

	Date	Meeting	Present/Position	Remarks
11	January 14, 2026 at 12H00 Thursday	Interview, Community Member (Near project site), Kazungula District	Interviewer- Leila Ching'ombe - KEGS - Consultant Interviewee - Benson Cheelo Fuel Attendant Oasis Energies	- What are the main economic activities in this area? The filling station - What could be the main effect of the solar plant project on your operation? The respondent mentioned the positive effect is that it will bring in employment opportunities - Do you have any concern over the construction of the solar project? The respondent expressed concern that the project site is located within an elephant corridor as a result there is a risk that solar panels could be damaged by elephants - Do you support the project? Why? The project is supported
12	January 14, 2026 at 12H30 Thursday	Interview, Community Member (Near project site), Kazungula District	Interviewer- Gina Katebe, KEGS - Consultant Interviewee- Mrs Makeshe Teacher, Mr. E. Ndlovu (Sales Man) and Mrs Naomi Nyirongo Residents	What are the main economic activities in this area? Filling stations and charcoal traders What could be the main effect of the solar plant project on your operation? The interviewee noted that the area currently lacks lighting making movements at night risky, therefore the project is expected to enhance safety and security within the area Do you have any concern over the construction of the solar project? No concern Do you support the project? Why? The respondent is in support of the project as it is there are no industries in Kazungula so this project will help by creating jobs
13	January 14, 2026 at 14H00 Thursday	Interview, Community Member (Near project site), Kazungula District	Interviewer -Gina Katebe - KEGS Consultant Interviewee- Mr M. Katukula - Farmer	- What are the main economic activities in this area? Farming - What could be the main effect of the solar plant project on your operation? No negative effect - Do you have any concern over the construction of the solar project? No concern mentioned - Do you support the project? Why? The respondent supports the project
		Interview, DEBS Office (Near project	Interviewer- Leila Ching'ombe - KEGS Consultant	1) What are the main economic activities in this area? Farming trading fabrications, transportation and charcoal production

	Date	Meeting	Present/Position	Remarks
		site), Kazungula District	Interviewee- P. Moonga - Accountant, Enerst Kamanga -Procurement Officer and Emmanuel Banda - ICT Officer	2) <i>What could be the main effect of the solar plant project on your operation?</i> The respondents felt that the project will bring in positive effects on their operations by supporting quality education through a continuous and reliable power supply. 3) <i>Do you have any concern over the construction of the solar project?</i> No negative concern just looking forward to when the project will commence. 4) <i>Do you support the project? Why?</i> The respondents indicated that they support the project because it is expected to contribute to reducing loadshedding in the country by increasing the supply of renewable energy.

Photographs for Courtesy Calls



Courtesy Call on the Acting District Commissioner



Courtesy Call on the Acting Council Secretary



Meeting with DFO and his Staff – District Forest Office



Meeting with DEBS – Kazungula



Meeting with Environment Africa – Kazungula



Meeting with Area Warden DNWP– Regional Office - Livingstone



Interviews with charcoal producers within the project site



Interviewing one of the residents in the project area



Site visit – Developer and Consultants



Visit to Kazungula ZESCO substation

Appendix 2C: Meeting attendance registers

ATTENDANCE REGISTER

Strategic Environmental Assessment (SEA) for the Construction of a 28MW Solar Plant Project

Stakeholder Engagement Meeting – Kazungula (Southern Province)

Venue: Kazungula Council Chambers... Date: 18.01.2026... Time: 10:00 AM

	Name	Organisation	Position	GENDER Male (M) Female (F)	PHONE	SIGNATURE	EMAIL
1	Robby Kasubika	KESS	consultant	M	0979319871		robby.kasubika@gmail.com
2	Rajina Katsere	KESS	consultant	F	0979934733		rajina.katsere@gmail.com
3	SPANNY NYAMAZANA	MWDS/DWRD	DWDO	M	097623450		nyamazana.spany@gmail.com
4	AKAPELWA MUTHA	M.I.H.U.D	T.G.W.	M	0974274976		akapelwa.mutha@gmail.com
5	Maxwell Kazumba	District Admin	D.A	M	0979578549		maxwellkazumba@gmail.com
6	CRYSTONE LUKANDO	NATIONAL ASSEMBLY	A.A	M	0974115664		crystone4@gmail.com
7	HASTINGS MURELE	NIFE-KAZ	L.T	M	0973292666		hastingsmurele23@gmail.com
8	CHULELA ZIMBA	SWCL	RM	M	0976550568		chulela.zimba@gmail.com
9	PISCAR MUSOKO	D.F.C	I.O	F	0977816465		piscarmusoko@gmail.com
10	Fela Chinganda	KESS	Consultant	F	09761657831		chingandafela@gmail.com
11	JANEI CHIROLO	KESS	Consultant	F	0977491949		janeichirilo@gmail.com
12	MIBETHA AKAPELWA	District Admin	DAO	M	0979152768		akapelwa.mibetha@gmail.com



"Knowledge & Leadership"

ATTENDANCE REGISTER

Strategic Environmental Assessment (SEA) for the Construction of a 28MW Solar Plant Project

Stakeholder Engagement Meeting – Kazungula (Southern Province)

Venue: Kazungula Council Chamber Date: 13/01/2026 Time: 10:00

	Name	Organisation	Position	GENDER Male (M) /Female (F)	PHONE	SIGNATURE	EMAIL
1	Kayula Chiseta	KEGS	Consultant	F	0977384297		kayulandi@kegs.co.zm@gmail.com
2	MURRAY MUSA	Z.P	CIO	M	0922222777		Murray.Musa@zpg.co.zm
3	MURRAY MUSA	K.T.C	DAED	M	09778711942		Sirotanga@zpg.co.zm
4	Isaac C. Kumbwira	FB	DFD	M	0974547188		Isaac.kumbwira@kegs.co.zm
5	A LUMBWIRA	WTC	CACO	M	09775181711		akajoyes09@gmail.com
6	K. MUKA	District Admin	AAO	M	09778456000		mukakap@gmail.com
7	Pamela Madzga	DMMU	DDMU	F	0975655051		pamela.madzga@gmail.com
8	Festus Gyinda	Education	BLO	M	0922601255		festus.madzga@zpg.co.zm
9	chepi musonda	FORESTRY	TECHNICIAN	F	0961713535		chepi.musonda@gmail.com
10	WAKUMELO JIINALI	ZANIS	ADINO	M	0979062400		wakumelosjiinali@gmail.com
11	BADWIRE MURRAY	SUD	SUD	M	09778711942		badwire@gmail.com
12							





ATTENDANCE REGISTER

Strategic Environmental Assessment (SEA) for the Construction of a 28MW Solar Plant Project

Stakeholder Engagement Meeting – Kazungula (Southern Province)



Venue: Kazungula project area

Date: 14/01/2026

Time: 10:00

	Name	Organisation	Position	GENDER Male (M) /Female (F)	PHONE	SIGNATURE	EMAIL
1	Jacobine Shange	Environment	Project officer	female	0967798091	<i>[Signature]</i>	shangenj@gmail.com
2	STANLEY CHURURUS	ENVIRONMENTAL AFFAIRS	STILL MANAGER	MALE	0972861593	<i>[Signature]</i>	CHURURUSSTANLEY@GMAIL.COM
3	Prince Balanda			MALE	077650011	<i>[Signature]</i>	
4	Mutidash mubuku		Nurse	Female	0972625254	<i>[Signature]</i>	
5	Benson Chereb	O.S	ATTENDANCE	MALE	0762093330	<i>[Signature]</i>	Cherebenson16@gmail.com
6	Mrs Mureshe	Wing Albert Teacher	Teacher	f	0979115617	<i>[Signature]</i>	
7	G. Ndlovu	OASIS	Salesman	M	0971922630	<i>[Signature]</i>	Geshmondhlan80@gmail.com
8	Naomi Ndirongo			f	0978022246	<i>[Signature]</i>	
9	M Kapfukula		farmer	m	0573304696	<i>[Signature]</i>	
10	P. Mwaona	DAB/KRE	ATTENDANCE	m	0978650109	<i>[Signature]</i>	waigangj@gmail.com
11	ENEST KAMUKA	DFBS/ASO	Document Officer	M	0972576505	<i>[Signature]</i>	enestkamuka@gmail.com
12	Kamuel Banda	DEB/KRE	ICT-OFFICER	M	0972461973	<i>[Signature]</i>	enestkamuka@gmail.com

Appendix 2D: Minutes for the meetings with stakeholders

**MINUTES OF THE STAKEHOLDER CONSULTATION MEETING
PROPOSED CONSTRUCTION OF A SOLAR POWER PLANT – KAZUNGULA DISTRICT**

Date: 13 January 2026

Time: 10:00 – 12:30

Venue: Council Chamber, Kazungula Town Council

1. Attendance

1.1 Developer and ESIA Consultants

Name	Position	Organisation
Mr. Robby Kasubika	ESIA Consultant (Team Leader)	KEGS
Mrs. Janet Chikololo	ESIA Consultant	KEGS
Ms. Kayula Chisela	ESIA Consultant	KEGS
Mr. Moses Nkonde	ESIA Consultant	KEGS
Ms. Gina Katebe	ESIA Consultant	KEGS

1.2 Stakeholders

Stakeholders drawn from government institutions, civil society organisations, and the local community were present. Details are provided in the signed attendance register appended to these minutes.

2. Agenda

Opening Prayer

Introductions

Opening Remarks

Presentation of the Project and ESIA Process

Plenary Discussion (Stakeholder Views and Concerns)

Closing Remarks

Closing Prayer

3. Proceedings

The meeting was called to order at 10:00 hours by Mr. Robby Kasubika, who served as Chairperson and Moderator. He welcomed all participants and outlined the purpose of the meeting, stating that it was a stakeholder consultation forum convened to solicit views, concerns, and recommendations regarding the proposed construction of a solar power plant in Kazungula District, Southern Province.

An opening prayer was offered, after which participants introduced themselves. The Chairperson then invited the Acting District Commissioner (DC) to deliver the opening remarks.

4. Opening Remarks

The Acting District Commissioner, Mr. Akabondo Mbeha, delivered the opening remarks. He noted that the proposed solar power project aligns with the Government of Zambia's efforts to address ongoing power shortages in the country. He expressed appreciation to the Developer, Victoria Falls University in collaboration with Africa Clean Energy Solutions, for selecting Kazungula District as a beneficiary of the project.

Acting DC giving opening remarks



The Acting DC encouraged all stakeholders to support the initiative and cooperate in facilitating timely approvals. He further welcomed the ESIA consultants to the district and assured them of the District Administration's support throughout the assignment.

5. Project and ESIA Presentation

The project and Environmental and Social Impact Assessment (ESIA) presentation was delivered by Mr. Robby Kasubika and Kayula Chisela, ESIA Consultants from Kasumwa Enviroconsult & General Supplies (KEGS). The presentation covered:

- Project background and objectives;
- Location of the proposed solar power plant near Kazungula CBD;
- Key infrastructure components, including a 600-metre transmission line connecting the plant to the Kazungula ZESCO Substation;
- The ESIA process and regulatory requirements; and
- The role of stakeholders in the environmental assessment process.



Consultant presenting on the project and ESIA process

The presenter informed stakeholders that the consultation was conducted in compliance with the Environmental Management Act No. 12 of 2011 and the World Bank Environmental and Social Standard 10 (ESS10). Participants were encouraged to freely raise questions, concerns, and suggestions related to the project.

6. Plenary Discussion

Stakeholders actively participated in the discussion session. Key issues raised and responses provided by the Consultant and Developer are summarised in Table 1 below.

Table 1: Stakeholder Issues and Responses

Stakeholder	Issues / Comments	Response
Nchimunya Siantanga	What is the current land-use status of the project site?	The land is zoned for commercial use.
Isaiah Chilenga	How will compliance with ESIA commitments during construction be ensured?	The developer will engage an environmental and social supervision firm; regular monitoring will be undertaken by regulators and consultants.
Akabondo Mbeha	Do consultants provide recommendations on environmental and community management?	Yes. The ESIA provides mitigation measures, and ZEMA's Decision Letter includes binding conditions enforced by regulatory agencies.
Isaiah Chilenga	Have all stakeholders and community members been consulted?	Stakeholder consultation is ongoing. This meeting forms part of a continuous engagement process, and participants are encouraged to sensitise communities.
Hastings Mwete	Will local labour be engaged, and how will this be monitored?	The DC's Office, acting as the Labour Office, will be involved. The developer committed to prioritising local labour in line with labour laws.
Isaiah Chilenga	High groundwater salinity may affect borehole water use for panel cleaning.	A geohydrological study is being commissioned; findings will guide water sourcing decisions, including possible use of SWASCO water.
Musenge Musenge	What is the total cost of the project?	The estimated project cost is approximately USD 22.3 million .
Festus Banda	Where will the generated power be supplied?	Power will be injected into the national grid via the ZESCO substation.
Isaac Kumwenda	Forestry clearance is required before tree removal, including inventory and valuation fees.	The requirement was noted, and the Forestry Department will be formally engaged.
Nchimunya Siantanga	Can the developer provide the local authority with a copy of the title deed?	Yes, the title deed will be submitted to the Council.
Isaiah Chilenga	Will the solar plant be a hybrid system?	The project is a ground-mounted photovoltaic (PV) solar facility, producing power for approximately 4.6 hours per day.
Nchimunya Siantanga	Health, gender, HIV/AIDS, labour, and human rights issues should be mainstreamed.	The recommendation was noted and will be integrated into project design and implementation.

7. Stakeholder Support for the Project

At the conclusion of the discussions, the Chairperson sought confirmation from participants regarding their position on the proposed project. All stakeholders present expressed support for the project and welcomed its implementation in Kazungula District.

8. Closing Remarks

Closing remarks were delivered by Mr. Isaac Kumwenda, District Forest Officer. He expressed appreciation for the project and emphasized the importance of strict adherence to the ESIA recommendations and regulatory requirements during implementation. The meeting was adjourned at 12:30 hours with a closing prayer.

Chairperson: Robby Kasubika

Signature:  _____

Secretary: Exilda Kafunda

Signature:  _____

Photographs for stakeholder meeting



Part of the audience during the stakeholder meeting



Stakeholders who attended the meeting



Participants making submissions during the meeting

Appendix 3A. List of threatened plant species found in Zambia based on Bingham et al 2017

DD (data deficiency), LR (Lower Risk) lc (least concern), VU (Vulnerable), nt (near threatened), EX (Extinct) EN (Endangered) and EXW (Extinct in the wild)

Family Name	Species Name	Endemic	Red data
Acanthaceae	<i>Justicia salvioides</i>		DD
Acanthaceae	<i>Duosperma fimbriatum</i>		DD
Acanthaceae	<i>Duosperma fanshawei</i>		DD
Acanthaceae	<i>Duosperma cuprinum</i>		DD
Amaranthaceae	<i>Pandiaka richardsiae</i>		LR-lc
Amaranthaceae	<i>Pandiaka confusa</i>		LR-lc
Amaranthaceae	<i>Celosia chenopodiifolia</i>		DD
Amaranthaceae	<i>Celosia richardsiae</i>		VU
Amaryllidaceae	<i>Crinum papillosum</i>		EN
Amaryllidaceae	<i>Crinum jasonii</i>		VU
Amaryllidaceae	<i>Crinum subcernuum</i>		DD
Amaryllidaceae	<i>Crinum binghamii</i>		LR-nt
Anacardiaceae	<i>Ozoroa kassneri</i> var. <i>rhodesica</i>		LR-lc
Anacardiaceae	<i>Ozoroa viridis</i>		DD
Anacardiaceae	<i>Ozoroa bredoi</i>		DD
Anacardiaceae	<i>Lannea schimperi</i>		DD
Anacardiaceae	<i>Lannea virgata</i>		LR-lc
Anacardiaceae	<i>Sorindeia juglandifolia</i>		DD
Anacardiaceae	<i>Lannea gossweileri</i> var. <i>tomentella</i>		DD
Anacardiaceae	<i>Rhus longipes</i> var. <i>schinoides</i>		LR-lc
Anacardiaceae	<i>Rhus ochracea</i> var. <i>saxicola</i>		DD
Annonaceae	<i>Uvariastrum hexaloboides</i>	Near-endemic	LR-lc
Annonaceae	<i>Uvaria edulis</i>		VU
Apiaceae	<i>Frommia ceratophylloides</i>		VU
Apiaceae	<i>Aframmi longiradiatum</i>		VU
Apocynaceae subfamilies Apocynoideae and Rauvolfioideae	<i>Adenium multiflorum</i>		VU
Apocynaceae subfamilies Apocynoideae and Rauvolfioideae	<i>Strophanthus angusii</i>		LR-lc
Apocynaceae subfamilies Apocynoideae and Rauvolfioideae	<i>Strophanthus eminii</i>		VU
Apocynaceae subfamilies Asclepiadoideae and Secamonoideae	<i>Ceropegia cataphyllaris</i>		DD
Apocynaceae subfamilies Asclepiadoideae and Secamonoideae	<i>Stapelia gigantea</i>		LR-lc
Apocynaceae subfamily Periplocoideae	<i>Raphionacme grandiflora</i>		DD
Aponogetonaceae	<i>Aponogeton stuhlmannii</i>		DD

Araceae	<i>Amorphophallus abyssinicus</i> subsp. <i>unyikae</i>		LR-lc
Araliaceae	<i>Schefflera abyssinica</i>		VU
Arecaceae	<i>Hyphaene petersiana</i>		DD
Asphodelaceae	<i>Aloe luapulana</i>		DD
Asphodelaceae	<i>Aloe esculenta</i>		EX?
Asphodelaceae	<i>Aloe veseyi</i>		DD
Asphodelaceae	<i>Aloe excelsa</i> var. <i>excelsa</i>		VU
Asphodelaceae	<i>Aloe milne-redheadii</i>		DD
Asphodelaceae	<i>Aloe bicomitum</i>		DD
Asteraceae	<i>Bidens oligoflora</i>		DD
Asteraceae	<i>Vernonia madefacta</i>		DD
Asteraceae	<i>Pleiotaxis angustirugosa</i>	Endemic	DD
Asteraceae	<i>Pleiotaxis oxylepis</i>	Endemic	VU
Asteraceae	<i>Vernonia tanganyikensis</i>		LR-lc
Asteraceae	<i>Vernonia najas</i>		VU
Asteraceae	<i>Vernonia mutimushii</i>		VU
Asteraceae	<i>Vernonia mushituensis</i>		LR-lc
Asteraceae	<i>Rastrophyllum pinnatipartitum</i>	Endemic	DD
Asteraceae	<i>Vernonia isoetifolia</i>		VU
Asteraceae	<i>Erythrocephalum scabrifolium</i>		VU
Asteraceae	<i>Vernonia helodea</i>		DD
Asteraceae	<i>Ageratinastrum palustre</i>		VU
Asteraceae	<i>Gutenbergia mweroensis</i>		VU
Asteraceae	<i>Emiliella luwiikae</i>	Endemic	DD
Asteraceae	<i>Gutenbergia spermacoceoides</i>		VU
Asteraceae	<i>Vernonia lycioides</i>		DD
Asteraceae	<i>Gutenbergia trifolia</i>		VU
Asteraceae	<i>Vernonia zambiana</i>		VU
Asteraceae	<i>Erythrocephalum dictyophlebium</i>		DD
Asteraceae	<i>Bidens rubicundula</i>	Endemic	VU
Asteraceae	<i>Bidens urceolata</i>		LR-nt
Balsaminaceae	<i>Impatiens limnophila</i>		LR-lc
Balsaminaceae	<i>Impatiens hydrogetonoides</i> subsp. <i>hydrogetonoides</i>		DD
Begoniaceae	<i>Begonia pygmaea</i>		DD
Bombacaceae	<i>Adansonia digitata</i>		LR-lc
Boraginaceae	<i>Cystostemon loveridgei</i>		DD
Boraginaceae	<i>Cystostemon mwiniungensis</i>		DD
Boraginaceae	<i>Cystostemon hispidissimus</i> subsp. <i>zambiensis</i>	Endemic	VU
Brassicaceae	<i>Coronopus integrifolius</i>		DD
Campanulaceae	<i>Wahlenbergia ramosissima</i> subsp. <i>richardsiae</i>		VU
Campanulaceae	<i>Wahlenbergia cephalodina</i>		DD

Campanulaceae	<i>Monopsis stellarioides</i>		LR-lc
Capparaceae	<i>Cleome macrophylla</i> var. <i>macrophylla</i>		LR-lc
Capparaceae	<i>Boscia cauliflora</i>		LR-lc
Capparaceae	<i>Maerua paniculata</i>	Endemic	VU
Chrysobalanaceae	<i>Maranthes floribunda</i>		LR-lc
Chrysobalanaceae	<i>Parinari excelsa</i>		LR-lc
Chrysobalanaceae	<i>Magnistipula sapinii</i>		LR-lc
Chrysobalanaceae	<i>Magnistipula butayi</i> subsp. <i>bangweolensis</i>	Near-endemic	LR-lc
Clusiaceae	<i>Garcinia volkensii</i>		LR-nt
Clusiaceae	<i>Garcinia smeathmannii</i>		LR-nt
Clusiaceae	<i>Psorospermum baumii</i>		LR-nt
Clusiaceae	<i>Psorospermum febrifugum</i>		LR-nt
Clusiaceae	<i>Garcinia livingstonei</i>		LR-nt
Clusiaceae	<i>Garcinia punctata</i>		LR-nt
Clusiaceae	<i>Garcinia pachyclada</i>	Endemic	LR-nt
Clusiaceae	<i>Garcinia huillensis</i>		LR-nt
Colchicaceae	<i>Gloriosa sessiliflora</i>		LR-lc
Combretaceae	<i>Combretum padoides</i>		DD
Combretaceae	<i>Meiostemon tetrandrus</i> subsp. <i>tetrandrus</i>		VU
Combretaceae	<i>Combretum celastroides</i> subsp. <i>celastroides</i>		LR-lc
Combretaceae	<i>Meiostemon tetrandrus</i> subsp. <i>australis</i>		VU
Combretaceae	<i>Pteleopsis pteleopsoides</i>	Endemic	VU
Combretaceae	<i>Combretum celastroides</i> subsp. <i>laxiflorum</i>		LR-lc
Combretaceae	<i>Combretum mweroense</i>	Endemic	VU
Commelinaceae	<i>Aneilema richardsae</i>		DD
Commelinaceae	<i>Commelina grandis</i>		DD
Commelinaceae	<i>Commelina pycnospatha</i>		DD
Connaraceae	<i>Burtia prunoides</i>		VU
Convolvulaceae	<i>Ipomoea protea</i>		DD
Convolvulaceae	<i>Merremia stellata</i>		DD
Convolvulaceae	<i>Ipomoea fanshawei</i>	Near-endemic	LR-lc
Convolvulaceae	<i>Ipomoea milnei</i>		DD
Convolvulaceae	<i>Ipomoea richardsiae</i>	Endemic	VU
Cucurbitaceae	<i>Trochomeria subglabra</i>		DD
Cucurbitaceae	<i>Cucumis humifructus</i>		VU
Cyperaceae	<i>Actinoschoenus repens</i>		DD
Cyperaceae	<i>Pycurus flavescens</i>		LR-lc
Cyperaceae	<i>Ascolepis pseudopeteri</i>	Endemic	DD
Cyperaceae	<i>Scleria lacustris</i>		DD
Cyperaceae	<i>Scleria delicatula</i>		DD
Cyperaceae	<i>Pycurus lanceolatus</i>		LR-lc
Cyperaceae	<i>Ascolepis trigona</i>	Endemic	DD

Cyperaceae	<i>Bulbostylis fimbriatylidoides</i>		DD
Cyperaceae	<i>Scleria calcicola</i>		DD
Cyperaceae	<i>Ascolepis majestuosa</i>		DD
Cyperaceae	<i>Alinula malawica</i>		DD
Cyperaceae	<i>Scleria longispiculata</i>		DD
Cyperaceae	<i>Carex lycurus</i>		DD
Cyperaceae	<i>Scleria xerophila</i>		DD
Cyperaceae	<i>Scleria fulvipilosa</i>		DD
Cyperaceae	<i>Scleria zambesica</i>		DD
Cyperaceae	<i>Scleria lucentinigrans</i>		DD
Cyperaceae	<i>Scleria patula</i>		DD
Cyperaceae	<i>Scleria polyrrhiza</i>		DD
Cyperaceae	<i>Lipocarpa robinsonii</i>		DD
Cyperaceae	<i>Cyperus altochrysocephalus</i>		DD
Cyperaceae	<i>Cyperus kasamensis</i>		DD
Cyperaceae	<i>Cyperus robinsonii</i>		DD
Cyperaceae	<i>Cyperus zambesiensis</i>		DD
Cyperaceae	<i>Lipocarpa echinus</i>		DD
Cyperaceae	<i>Ascolepis lineariglumis</i> var. <i>lineariglumis</i>		LR-lc
Cyperaceae	<i>Ascolepis lineariglumis</i> var. <i>pulcherrima</i>	Endemic	DD
Cyperaceae	<i>Ascolepis ampullacea</i>		DD
Cyperaceae	<i>Schoenoplectus rhodesicus</i>		DD
Cyperaceae	<i>Scleria procumbens</i>		DD
Cyperaceae	<i>Pycnus poikilostachys</i>		DD
Cyperaceae	<i>Ascolepis pusilla</i>		DD
Cyperaceae	<i>Bulbostylis clarkeana</i>		LR-nt
Cyperaceae	<i>Pycnus atrorubidus</i>		DD
Cyperaceae	<i>Pycnus micromelas</i>		DD
Cyperaceae	<i>Volkiella disticha</i>		VU
Cyperaceae	<i>Scleria chlorocalyx</i>		DD
Dilleniaceae	<i>Tetracera alnifolia</i>		LR-lc
Dioscoreaceae	<i>Dioscorea praeheensis</i>		LR-nt
Dipterocarpaceae	<i>Marquesia acuminata</i>		VU
Dracaenaceae	<i>Sansevieria downsii</i>		VU
Ebenaceae	<i>Diospyros mweroensis</i>		DD
Euphorbiaceae	<i>Euphorbia williamsonii</i>		DD
Euphorbiaceae	<i>Monadenium friesii</i>		VU
Euphorbiaceae	<i>Monadenium hirsutum</i>		VU
Euphorbiaceae	<i>Monadenium pseudoracemosum</i> var. <i>lorifolium</i>		VU
Euphorbiaceae	<i>Monadenium pudibundum</i> var. <i>pudibundum</i>		VU
Euphorbiaceae	<i>Monadenium schubei</i> (pax)		DD
Euphorbiaceae	<i>Jatropha pachyrrhiza</i>		DD

Euphorbiaceae	<i>Euphorbia cooperi</i> var. <i>ussanguensis</i>		DD
Euphorbiaceae	<i>Euphorbia distinctissima</i>		VU
Euphorbiaceae	<i>Tragia prostrata</i>		VU
Euphorbiaceae	<i>Tragia micromeres</i>		VU
Euphorbiaceae	<i>Euphorbia debilis</i> spina		EN
Euphorbiaceae	<i>Acalypha dikuluwensis</i>		DD
Euphorbiaceae	<i>Euphorbia fanshawei</i>		VU
Euphorbiaceae	<i>Euphorbia whellanii</i>		DD
Euphorbiaceae	<i>Euphorbia speciosa</i>		VU
Euphorbiaceae	<i>Euphorbia seretii</i> var. <i>variantissima</i>		DD
Euphorbiaceae	<i>Euphorbia platyrrhiza</i>		DD
Euphorbiaceae	<i>Euphorbia perplexa</i> var. <i>kasamana</i>		VU
Euphorbiaceae	<i>Euphorbia perplexa</i> var. <i>perplexa</i>		DD
Euphorbiaceae	<i>Euphorbia papillosicapsa</i>		DD
Euphorbiaceae	<i>Euphorbia mwinilungensis</i>		DD
Euphorbiaceae	<i>Euphorbia luapulana</i>		DD
Euphorbiaceae	<i>Euphorbia jubata</i>		DD
Euphorbiaceae	<i>Euphorbia inundaticola</i>		DD
Euphorbiaceae	<i>Euphorbia griseola</i> subsp. <i>zambiensis</i>		DD
Euphorbiaceae	<i>Croton gossweileri</i>		DD
Euphorbiaceae	<i>Euphorbia decidua</i>		DD
Euphorbiaceae	<i>Croton scheffleri</i>		VU
Euphorbiaceae	<i>Monadenium discoideum</i>		VU
Euphorbiaceae	<i>Sapium acetosella</i> var. <i>lineare</i>		DD
Euphorbiaceae	<i>Jatropha seineri</i> var. <i>tomentella</i>		EN
Euphorbiaceae	<i>Euphorbia fortissima</i>		DD
Euphorbiaceae	<i>Monadenium filiforme</i>		VU
Euphorbiaceae	<i>Tragiella friesiana</i>		VU
Fabaceae subfamily Caesalpinioideae	<i>Dialium angolense</i>		LR-lc
Fabaceae subfamily Caesalpinioideae	<i>Cryptosepalum exfoliatum</i> subsp. <i>puberulum</i>		DD
Fabaceae subfamily Caesalpinioideae	<i>Brachystegia puberula</i>		LR-lc
Fabaceae subfamily Caesalpinioideae	<i>Brachystegia michelmorei</i>		DD
Fabaceae subfamily Caesalpinioideae	<i>Aphanocalyx trapnellii</i>		VU
Fabaceae subfamily Caesalpinioideae	<i>Baikiaea plurijuga</i>		VU
Fabaceae subfamily Caesalpinioideae	<i>Bussea massaiensis</i> subsp. <i>rhodesica</i>		VU
Fabaceae subfamily Caesalpinioideae	<i>Cryptosepalum exfoliatum</i> subsp. <i>craspedoneuron</i>		DD
Fabaceae subfamily Caesalpinioideae	<i>Daniellia alsteeniana</i>		EN
Fabaceae subfamily Mimosoideae	<i>Cathormion altissimum</i> var. <i>altissimum</i>		LR-lc

Fabaceae subfamily Mimosoideae	<i>Entada chrysostachys</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Pseudoprosopis fischeri</i>		VU
Fabaceae subfamily Mimosoideae	<i>Acacia galpinii</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Acacia seyal</i> var. <i>fistula</i>		LR-lc
Fabaceae subfamily Mimosoideae	<i>Acacia rehmanniana</i>		DD
Fabaceae subfamily Mimosoideae	<i>Entada arenaria</i> subsp. <i>microcarpa</i>	Near-endemic	LR-nt
Fabaceae subfamily Mimosoideae	<i>Acacia hebeclada</i> subsp. <i>chobiensis</i>		LR-lc
Fabaceae subfamily Mimosoideae	<i>Albizia isenbergiana</i>		DD
Fabaceae subfamily Mimosoideae	<i>Parkia filicoidea</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Acacia hockii</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Acacia pilispina</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Entada dolichorrhachis</i>	Endemic	VU
Fabaceae subfamily Mimosoideae	<i>Entada arenaria</i> subsp. <i>arenaria</i>		LR-nt
Fabaceae subfamily Mimosoideae	<i>Entada bacillaris</i> var. <i>plurijuga</i>		DD
Fabaceae subfamily Papilionoideae	<i>Pterocarpus tinctorius</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Pterocarpus angolensis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Droogmansia pteropus</i> var. <i>axillaris</i>		VU
Fabaceae subfamily Papilionoideae	<i>Dolichos magnificus</i>		DD
Fabaceae subfamily Papilionoideae	<i>Dolichos filifoliolus</i>		DD
Fabaceae subfamily Papilionoideae	<i>Cordyla africana</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Tephrosia coronilloides</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Tephrosia kasikiensis</i> subsp. <i>chinsaliana</i>		VU
Fabaceae subfamily Papilionoideae	<i>Tephrosia muenzneri</i> subsp. <i>pedalis</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria criniramea</i>		VU
Fabaceae subfamily Papilionoideae	<i>Crotalaria cylindrostachys</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria nuda</i>	Endemic	LR-nt
Fabaceae subfamily Papilionoideae	<i>Leptoderris goetzei</i>		LR-nt
Fabaceae subfamily Papilionoideae	<i>Aeschynomene bracteosa</i> var. <i>major</i>		DD

Fabaceae subfamily Papilionoideae	<i>Aeschynomene lateriticola</i>		VU
Fabaceae subfamily Papilionoideae	<i>Aeschynomene pseudoglabrescens</i>	Endemic	LR-lc
Fabaceae subfamily Papilionoideae	<i>Aeschynomene stipulosa</i>	Endemic	VU
Fabaceae subfamily Papilionoideae	<i>Tephrosia richardsiae</i> subsp. <i>erucifera</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Tephrosia robinsoniana</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria involutifolia</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria lachnocarpoides</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria lachnophora</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Tephrosia zambiana</i>		DD
Fabaceae subfamily Papilionoideae	<i>Ophrestia unicostata</i>		DD
Fabaceae subfamily Papilionoideae	<i>Ophrestia breviracemosa</i>		VU
Fabaceae subfamily Papilionoideae	<i>Crotalaria lukafuensis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria microcarpa</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria natalitia</i> var. <i>natalitia</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Bobgunnia madagascariensis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria nudiflora</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria pallidicaulis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria polytricha</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria ringoetii</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Microcharis spathulata</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria shirensis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria simoma</i>		VU
Fabaceae subfamily Papilionoideae	<i>Crotalaria sphaerocarpa</i> subsp. <i>sphaerocarpa</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria trinervia</i>		VU
Fabaceae subfamily Papilionoideae	<i>Crotalaria tristis</i>		DD
Fabaceae subfamily Papilionoideae	<i>Crotalaria umbellifera</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Crotalaria vanmeelii</i>		DD
Fabaceae subfamily Papilionoideae	<i>Leptoderris nobilis</i>		LR-lc

Fabaceae subfamily Papilionoideae	<i>Baphia speciosa</i>	Endemic	VU
Fabaceae subfamily Papilionoideae	<i>Kotschya suberifera</i>		VU
Fabaceae subfamily Papilionoideae	<i>Kotschya prittwitzii</i> var. <i>parviflora</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Kotschya longiloba</i>	Endemic	VU
Fabaceae subfamily Papilionoideae	<i>Kotschya imbricata</i>		DD
Fabaceae subfamily Papilionoideae	<i>Kotschya africana</i> var. <i>latifoliola</i>		VU
Fabaceae subfamily Papilionoideae	<i>Dalbergia acutifoliolata</i>		DD
Fabaceae subfamily Papilionoideae	<i>Dalbergiella nyasae</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Desmodium fulvescens</i>		DD
Fabaceae subfamily Papilionoideae	<i>Indigofera emarginella</i> var. <i>longifoliolata</i>		VU
Fabaceae subfamily Papilionoideae	<i>Indigofera deightonii</i> subsp. <i>rhodesica</i>		DD
Fabaceae subfamily Papilionoideae	<i>Humularia submarginalis</i>		DD
Fabaceae subfamily Papilionoideae	<i>Humularia pseudoeschynomene</i>		VU
Fabaceae subfamily Papilionoideae	<i>Humularia minima</i> subsp. <i>flabelliformis</i>		VU
Fabaceae subfamily Papilionoideae	<i>Humularia minima</i> subsp. <i>minima</i>		VU
Fabaceae subfamily Papilionoideae	<i>Humularia kapiensis</i> var. <i>repens</i>		VU
Fabaceae subfamily Papilionoideae	<i>Crotalaria goreensis</i>		LR-lc
Fabaceae subfamily Papilionoideae	<i>Vigna comosa</i> subsp. <i>aberncornensis</i>		VU
Gentianaceae	<i>Faroa corniculata</i>		VU
Gentianaceae	<i>Exacum oldenlandioides</i>		LR-nt
Gentianaceae	<i>Canscora kirkii</i>		VU
Gentianaceae	<i>Sebaea clavata</i>		DD
Gentianaceae	<i>Faroa alata</i>		DD
Gentianaceae	<i>Sebaea perpusilla</i>		VU
Gentianaceae	<i>Sebaea africana</i>		DD
Gentianaceae	<i>Sebaea alata</i>		DD
Gentianaceae	<i>Faroa minutiflora</i>		DD
Gentianaceae	<i>Sebaea fernandesiana</i>		DD
Gesneriaceae	<i>Streptocarpus</i> aff. <i>michelmoriei</i>		LR-lc
Hernandiaceae	<i>Gyrocarpus americanus</i> subsp. <i>africanus</i>		LR-lc
Hyacinthaceae	<i>Schizobasis angolensis</i>		DD
Hydrophyllaceae	<i>Hydrolea brevistyla</i>		DD
Hypoxidaceae	<i>Hypoxis cuanzensis</i>		DD
Hypoxidaceae	<i>Hypoxis filiformis</i>		DD

Hypoxidaceae	<i>Hypoxis goetzei</i>		EN
Hypoxidaceae	<i>Hypoxis villosa</i>		DD
Hypoxidaceae	<i>Curculigo pilosa</i>		VU
Iridaceae	<i>Moraea brevifolia</i>		LR-lc
Iridaceae	<i>Lapeirousia zambeziaca</i>		DD
Iridaceae	<i>Dierama longistylum</i>		DD
Iridaceae	<i>Gladiolus serenjensis</i>	Endemic	VU
Lamiaceae	<i>Pycnostachys verticillata</i>		LR-nt
Lamiaceae	<i>Tinnea coerulea</i> var. <i>coerulea</i>		LR-lc
Lamiaceae	<i>Tinnea gracilis</i>		LR-lc
Lamiaceae	<i>Tinnea aethiopica</i> subsp. <i>stolzii</i>		LR-lc
Lamiaceae	<i>Platostoma dilungense</i>		LR-nt
Lamiaceae	<i>Platostoma coeruleum</i>		DD
Lamiaceae	<i>Tinnea zambesiaca</i>		LR-lc
Lamiaceae	<i>Alvesia cylindricalyx</i>		DD
Lamiaceae	<i>Tinnea rhodesiana</i>		LR-lc
Lamiaceae	<i>Tinnea vestita</i>		LR-lc
Lamiaceae	<i>Tinnea apiculata</i>		LR-lc
Lamiaceae	<i>Tinnea antiscorbutica</i>		LR-nt
Lamiaceae	<i>Haumaniastrum glabrifolium</i>		LR-nt
Lamiaceae	<i>Leucas princei</i>		LR-nt
Lauraceae	<i>Beilschmiedia gilbertii</i> var. <i>glabra</i>		DD
Lentibulariaceae	<i>Genlisea pallida</i>		DD
Lentibulariaceae	<i>Genlisea glandulosissima</i>		DD
Linderniaceae	<i>Stemodiopsis glandulosa</i>		VU
Linderniaceae	<i>Crepidorhopalon bifolius</i>		LR-lc
Linderniaceae	<i>Crepidorhopalon tenuifolius</i>		VU
Linderniaceae	<i>Crepidorhopalon involucratum</i>		VU
Linderniaceae	<i>Craterostigma plantagineum</i>		DD
Loganiaceae	<i>Strychnos xantha</i>		LR-lc
Lythraceae	<i>Rotala gossweileri</i>		DD
Lythraceae	<i>Rotala myriophylloides</i>		DD
Lythraceae	<i>Nesaea purpurascens</i>		DD
Lythraceae	<i>Rotala fontinalis</i>		DD
Lythraceae	<i>Rotala submersa</i> var. <i>angustipetala</i>		DD
Lythraceae	<i>Rotala juniperina</i>		DD
Lythraceae	<i>Rotala dinteri</i>		DD
Lythraceae	<i>Nesaea robinsoniana</i>		DD
Malpighiaceae	<i>Triaspis lateriflora</i>		DD
Melastomataceae	<i>Dissotis caloneura</i> var. <i>pilosa</i>		DD
Melastomataceae	<i>Dichaetanthera erici-rosenii</i>	Near-endemic	LR-lc
Melastomataceae	<i>Antherotoma debilis</i>		DD
Melastomataceae	<i>Memecylon zambesiense</i>	Endemic	VU

Melastomataceae	<i>Dichaetanthera rhodesiensis</i>		DD
Melastomataceae	<i>Dissotis simonis-jamesii</i>	Near-endemic	LR-lc
Melastomataceae	<i>Dissotis glandulosa</i>		DD
Meliaceae	<i>Khaya anthotheca</i>		LR-nt
Meliaceae	<i>Entandrophragma delevoiyi</i>	Near-endemic	VU
Meliaceae	<i>Entandrophragma caudatum</i>		LR-lc
Meliaceae	<i>Turraea zambesica</i>		LR-nt
Menyanthaceae	<i>Nymphoides milnei</i>		DD
Menyanthaceae	<i>Nymphoides tenuissima</i>		LR-lc
Molluginaceae	<i>Corrigiola paniculata</i>		DD
Moraceae	<i>Ficus burkei</i>		LR-lc
Moraceae	<i>Ficus bussei</i>		LR-lc
Moraceae	<i>Ficus usambarensis</i>		LR-nt
Moraceae	<i>Ficus ottoniifolia</i> subsp. <i>macrosyce</i>		LR-lc
Moraceae	<i>Ficus trichopoda</i>		LR-lc
Moraceae	<i>Ficus natalensis</i> subsp. <i>leprieurii</i>		LR-lc
Moraceae	<i>Ficus asperifolia</i>		LR-lc
Moraceae	<i>Ficus natalensis</i> subsp. <i>natalensis</i>		LR-lc
Moraceae	<i>Ficus petersii</i>		DD
Moraceae	<i>Ficus lutea</i>		LR-lc
Moraceae	<i>Milicia excelsa</i>		CR
Moraceae	<i>Ficus ingens</i>		LR-lc
Moraceae	<i>Ficus glumosa</i>		LR-lc
Moraceae	<i>Ficus fischeri</i>		LR-lc
Moraceae	<i>Ficus sansibarica</i> subsp. <i>macrosperma</i>		LR-lc
Moraceae	<i>Ficus dicranostyla</i>		LR-nt
Moraceae	<i>Ficus cyathistipula</i> subsp. <i>cyathistipula</i>		LR-lc
Moraceae	<i>Ficus craterostoma</i>		LR-lc
Moraceae	<i>Ficus capreifolia</i>		LR-lc
Moraceae	<i>Ficus salicifolia</i>		LR-lc
Moraceae	<i>Morus mesozygia</i>		LR-nt
Moraceae	<i>Ficus pygmaea</i>		LR-lc
Moraceae	<i>Ficus verruculosa</i>		LR-lc
Moraceae	<i>Ficus polita</i> subsp. <i>polita</i>		LR-lc
Moraceae	<i>Ficus abutilifolia</i>		LR-lc
Moraceae	<i>Ficus vallis-choudae</i>		LR-lc
Moraceae	<i>Ficus ardisioides</i> subsp. <i>camptoneura</i>		LR-lc
Moraceae	<i>Ficus polita</i> subsp. <i>brevipedunculata</i>		LR-nt
Moraceae	<i>Ficus exasperata</i>		LR-lc
Moraceae	<i>Ficus barteri</i>		LR-lc
Moraceae	<i>Ficus ovata</i>		LR-lc
Moraceae	<i>Treculia africana</i> subsp. <i>africana</i> var. <i>africana</i>		LR-lc
Moraceae	<i>Ficus nigropunctata</i>		LR-lc

Moraceae	<i>Ficus wakefieldii</i>		LR-lc
Moraceae	<i>Ficus stuhlmannii</i>		LR-lc
Moraceae	<i>Ficus persicifolia</i>		DD
Moraceae	<i>Ficus scassellatii</i> subsp. <i>scassellatii</i>		LR-lc
Myrsinaceae	<i>Embelia upembensis</i>		VU
Oleaceae	<i>Chionanthus richardsiae</i>		VU
Oleaceae	<i>Chionanthus niloticus</i>		DD
Orchidaceae	<i>Satyrium princeae</i>		VU
Orchidaceae	<i>Satyrium monadenum</i>		VU
Orchidaceae	<i>Orthochilus corymbosus</i>	Endemic	DD
Orchidaceae	<i>Eulophia katangensis</i>		LR-lc
Orchidaceae	<i>Liparis molendinacea</i>		DD
Orchidaceae	<i>Disa roeperocharoides</i>	Near-endemic	VU
Orchidaceae	<i>Angraecopsis gassneri</i>		DD
Orchidaceae	<i>Disa nyikensis</i>		VU
Orchidaceae	<i>Satyrium microcorys</i>		VU
Orchidaceae	<i>Disa ukingensis</i>		VU
Orchidaceae	<i>Disa verdickii</i>	Near-endemic	DD
Orchidaceae	<i>Disa welwitschii</i> subsp. <i>welwitschii</i>		LR-nt
Orchidaceae	<i>Disa dichroa</i>		LR-lc
Orchidaceae	<i>Disperis aphylla</i> subsp. <i>bifolia</i>		VU
Orchidaceae	<i>Disperis bifida</i>	Near-endemic	CR
Orchidaceae	<i>Disperis breviloba</i>		DD
Orchidaceae	<i>Disa cryptantha</i>		DD
Orchidaceae	<i>Brachycorythis pilosa</i>		LR-lc
Orchidaceae	<i>Brachycorythis mixta</i>		DD
Orchidaceae	<i>Disa caffra</i>		DD
Orchidaceae	<i>Holothrix tridactylites</i>		VU
Orchidaceae	<i>Angraecum geniculatum</i>	Endemic	DD
Orchidaceae	<i>Habenaria velutina</i>		LR-nt
Orchidaceae	<i>Habenaria tubifolia</i>		EN
Orchidaceae	<i>Habenaria tentaculigera</i>		LR-nt
Orchidaceae	<i>Nervilia kotschy</i> var. <i>purpurata</i>		DD
Orchidaceae	<i>Platycoryne brevirostris</i>		VU
Orchidaceae	<i>Platycoryne isoetifolia</i>		LR-nt
Orchidaceae	<i>Platycoryne latipetala</i>		LR-nt
Orchidaceae	<i>Platycoryne micrantha</i>		LR-lc
Orchidaceae	<i>Platycoryne protearum</i> var. <i>recurvirostra</i>		LR-nt
Orchidaceae	<i>Platycoryne trilobata</i>		DD
Orchidaceae	<i>Platylepis glandulosa</i>		LR-lc
Orchidaceae	<i>Habenaria pubidens</i>	Near-endemic	VU
Orchidaceae	<i>Habenaria pasmithii</i>	Near-endemic?	VU
Orchidaceae	<i>Habenaria orthocentron</i>		DD

Orchidaceae	<i>Polystachya asper</i>		DD
Orchidaceae	<i>Polystachya erythrocephala</i>		DD
Orchidaceae	<i>Polystachya malingensis</i>	Near-endemic	DD
Orchidaceae	<i>Polystachya moreauae</i>		DD
Orchidaceae	<i>Habenaria malacophylla</i>		LR-lc
Orchidaceae	<i>Habenaria macrura</i>		LR-nt
Orchidaceae	<i>Habenaria macrotidion</i>		DD
Orchidaceae	<i>Habenaria leucotricha</i> var. <i>recticalcar</i>		LR-nt
Orchidaceae	<i>Habenaria humilior</i>		LR-nt
Orchidaceae	<i>Disperis katangensis</i> var. <i>minor</i>		DD
Orchidaceae	<i>Habenaria holubii</i>		VU
Orchidaceae	<i>Habenaria hirsutitrunci</i>		LR-nt
Orchidaceae	<i>Habenaria hebes</i>		EN
Orchidaceae	<i>Nervilia renschiana</i>		DD
Orchidaceae	<i>Habenaria cirrhata</i>		LR-lc
Orchidaceae	<i>Habenaria binghamii</i>		VU
Orchidaceae	<i>Habenaria argentea</i>		LR-nt
Orchidaceae	<i>Eulophia saxicola</i>		DD
Orchidaceae	<i>Roeperocharis wentzeliana</i>		LR-lc
Orchidaceae	<i>Eulophia richardsiae</i>		DD
Orchidaceae	<i>Nervilia bicarinata</i>		LR-nt
Orchidaceae	<i>Malaxis macclaudii</i>		DD
Orchidaceae	<i>Habenaria sochensis</i>		LR-lc
Orchidaceae	<i>Satyrium shireense</i>		VU
Orchidaceae	<i>Malaxis katangensis</i> var. <i>pygmaea</i>		VU
Orchidaceae	<i>Tridactyle translucens</i>		DD
Orchidaceae	<i>Orthochilus holubii</i>		DD
Orobanchaceae	<i>Buchnera pulcherrima</i>	Endemic	DD
Orobanchaceae	<i>Buchnera cryptocephala</i> var. <i>mwinilungensis</i>		VU
Orobanchaceae	<i>Buchnera laxiflora</i>	Endemic	LR-lc
Orobanchaceae	<i>Buchnera trilobata</i>		LR-lc
Orobanchaceae	<i>Buchnera arenicola</i>	Endemic	DD
Orobanchaceae	<i>Buchnera nervosa</i>	Endemic	VU
Orobanchaceae	<i>Buchnera ebracteolata</i>	Endemic	VU
Orobanchaceae	<i>Buchnera crassifolia</i>	Near-endemic	DD
Orobanchaceae	<i>Alectra glandulosa</i>	Endemic	LR-lc
Orobanchaceae	<i>Alectra pubescens</i>	Endemic	LR-lc
Orobanchaceae	<i>Buchnera chisumpae</i>	Endemic	VU
Orobanchaceae	<i>Buchnera nitida</i>	Near-endemic	DD
Oxalidaceae	<i>Oxalis abercornensis</i>		DD
Oxalidaceae	<i>Biophytum richardsiae</i>		VU
Oxalidaceae	<i>Biophytum nyikense</i>		VU
Pandanaceae	<i>Pandanus livingstonianus</i>		VU

Passifloraceae	<i>Basananthe holmesii</i>		LR-lc
Passifloraceae	<i>Basananthe baumii</i> var. <i>baumii</i>		DD
Passifloraceae	<i>Basananthe baumii</i> var. <i>caerulescens</i>		LR-lc
Passifloraceae	<i>Adenia tuberifera</i>		VU
Passifloraceae	<i>Adenia repanda</i>		LR-nt
Passifloraceae	<i>Adenia ovata</i>		LR-lc
Passifloraceae	<i>Adenia erecta</i>		VU
Peraceae	<i>Clusia whytei</i> var. <i>monticoloides</i>		VU
Phyllanthaceae	<i>Phyllanthus caespitosus</i>		LR-lc
Phyllanthaceae	<i>Phyllanthus microdendron</i> var. <i>asper</i>		LR-lc
Phyllanthaceae	<i>Phyllanthus tenuis</i>		LR-lc
Phyllanthaceae	<i>Phyllanthus friesii</i>		DD
Phyllanthaceae	<i>Phyllanthus zambicus</i>		LR-lc
Phyllanthaceae	<i>Phyllanthus polyanthus</i>		LR-lc
Phyllanthaceae	<i>Phyllanthus xiphephorus</i>		DD
Phyllanthaceae	<i>Phyllanthus tener</i>		DD
Phyllanthaceae	<i>Phyllanthus martinii</i>		DD
Phyllanthaceae	<i>Phyllanthus pseudocarunculatus</i>		DD
Plantaginaceae	<i>Limnophila crassifolia</i>		DD
Poaceae	<i>Hydrothauma manicatum</i>		LR-lc
Poaceae	<i>Hyparrhenia anemopaegma</i>		LR-lc
Poaceae	<i>Panicum bullockii</i>		LR-lc
Poaceae	<i>Panicum perangustatum</i>		DD
Poaceae	<i>Brachiaria pungipes</i>		LR-lc
Poaceae	<i>Panicum phippisii</i>		DD
Poaceae	<i>Panicum pseudoracemosum</i>		LR-lc
Poaceae	<i>Digitaria bidactyla</i>		LR-nt
Poaceae	<i>Pogonarthria refracta</i>		LR-lc
Poaceae	<i>Eragrostis fimbriata</i>		LR-lc
Poaceae	<i>Digitaria sacculata</i>		DD
Poaceae	<i>Digitaria procurrens</i>		DD
Poaceae	<i>Digitaria minoriflora</i>		DD
Poaceae	<i>Digitaria calcarata</i>		DD
Poaceae	<i>Brachyachne simonsii</i>		DD
Poaceae	<i>Eragrostis lepidobasis</i>		LR-nt
Poaceae	<i>Oreobambos buchwaldii</i>		CR
Poaceae	<i>Setaria homonyma</i>		LR-lc
Poaceae	<i>Eragrostis astreptoclada</i>		DD
Poaceae	<i>Eragrostis oligostachya</i>		LR-nt
Poaceae	<i>Setaria lindenberghiana</i>		LR-lc
Poaceae	<i>Digitaria tenuifolia</i>		LR-nt
Poaceae	<i>Eragrostis milnei</i>		LR-nt
Poaceae	<i>Eragrostis anacanthoides</i>		LR-lc

Poaceae	<i>Eragrostis punctiglandulosa</i>		VU
Poaceae	<i>Eragrostis spicigera</i>		LR-nt
Poaceae	<i>Eccoptocarpa obconiciventr</i>		LR-lc
Poaceae	<i>Eragrostis dentifera</i>		LR-nt
Poaceae	<i>Lophacme parva</i>		LR-lc
Poaceae	<i>Loxodera bovonei</i>		DD
Poaceae	<i>Diheteropogon microterus</i>		DD
Poaceae	<i>Eragrostis mariae</i>		LR-nt
Poaceae	<i>Eragrostis divaricata</i>		LR-lc
Poaceae	<i>Setaria pseudaristata</i>		LR-nt
Poaceae	<i>Setaria megaphylla</i>		LR-lc
Podostemaceae	<i>Leiothylax drummondii</i>		DD
Polygalaceae	<i>Securidaca longepedunculata</i>		LR-lc
Polygalaceae	<i>Securidaca welwitschii</i>		VU
Polygalaceae	<i>Polygala friesii</i>		LR-lc
Polygonaceae	<i>Oxygonum carnosum</i>		DD
Polygonaceae	<i>Oxygonum litorale</i>		DD
Portulacaceae	<i>Portulaca foliosa</i>		LR-nt
Primulaceae	<i>Anagallis rhodesica</i>		DD
Proteaceae	<i>Protea kibarensis</i> subsp. <i>cuspidata</i>		VU
Proteaceae	<i>Protea poggei</i> subsp. <i>mwinilungensis</i>		DD
Proteaceae	<i>Protea mafingensis</i>	Near-endemic	VU
Proteaceae	<i>Protea rupestris</i>		LR-nt
Rhizophoraceae	<i>Cassipourea fanshawei</i>	Endemic	VU
Rosaceae	<i>Prunus africana</i>		LR-nt
Rosaceae	<i>Hagenia abyssinica</i>		DD
Rubiaceae	<i>Pavetta redheadii</i>		VU
Rubiaceae	<i>Rytigynia adenodonta</i> var. <i>reticulata</i>		VU
Rubiaceae	<i>Fadogia tomentosa</i> var. <i>calvescens</i>		LR-lc
Rubiaceae	<i>Sericanthe andongensis</i> subsp. <i>andongensis</i> var. <i>andongensis</i>		LR-nt
Rubiaceae	<i>Rytigynia adenodonta</i> var. <i>adenodonta</i>		VU
Rubiaceae	<i>Sarcocephalus pobeguini</i>		DD
Rubiaceae	<i>Fadogia chlorantha</i> var. <i>chlorantha</i>		VU
Rubiaceae	<i>Fadogia gossweileri</i>		DD
Rubiaceae	<i>Fadogia triphylla</i> var. <i>pubicaulis</i>		DD
Rubiaceae	<i>Fadogia luangwae</i>	Endemic	DD
Rubiaceae	<i>Spermacoce annua</i>		VU
Rubiaceae	<i>Spermacoce bangweolensis</i>	Endemic	VU
Rubiaceae	<i>Spermacoce perennis</i> var. <i>perennis</i>		VU
Rubiaceae	<i>Spermacoce perennis</i> var. <i>fimbriolata</i>		VU
Rubiaceae	<i>Spermacoce princeae</i> var. <i>mwinilungae</i>		DD
Rubiaceae	<i>Spermacoce samfya</i>		DD
Rubiaceae	<i>Fadogia triphylla</i> var. <i>gracilifolia</i>		LR-lc

Rubiaceae	<i>Fadogia schmitzii</i>		VU
Rubiaceae	<i>Fadogia variifolia</i>		VU
Rubiaceae	<i>Amphiasma redheadii</i>		DD
Rubiaceae	<i>Vangueria volkensii</i> var. <i>kyimbilensis</i>		DD
Rubiaceae	<i>Coffea mufindiensis</i> subsp. <i>lundaziensis</i>	Near-endemic	VU
Rubiaceae	<i>Fadogia tomentosa</i> var. <i>flaviflora</i>		DD
Rubiaceae	<i>Fadogia verdickii</i>		LR-nt
Rubiaceae	<i>Batopedina linearifolia</i>		EN
Rubiaceae	<i>Pentanisia confertifolia</i>		VU
Rubiaceae	<i>Pavetta subumbellata</i> var. <i>subumbellata</i>		VU
Rubiaceae	<i>Tapiphyllum cinerascens</i> var. <i>laetum</i>		LR-lc
Rubiaceae	<i>Tapiphyllum cinerascens</i> var. <i>richardsiae</i>		LR-lc
Rubiaceae	<i>Tapiphyllum cinerascens</i> var. <i>cinerascens</i>		DD
Rubiaceae	<i>Tapiphyllum cistifolium</i> var. <i>latifolium</i>		DD
Rubiaceae	<i>Tapiphyllum molle</i>		LR-lc
Rubiaceae	<i>Tapiphyllum rhodesiacum</i>		LR-lc
Rubiaceae	<i>Rytigynia</i> sp. <i>F</i>		DD
Rubiaceae	<i>Pavetta pygmaea</i>		DD
Rubiaceae	<i>Pavetta johnstonii</i> subsp. <i>breviloba</i>		VU
Rubiaceae	<i>Pachystigma micropyren</i>		DD
Rubiaceae	<i>Pachystigma albosetulosum</i>		DD
Rubiaceae	<i>Psydrax whitei</i>		VU
Rubiaceae	<i>Psychotria pumila</i> var. <i>subumbellata</i>		DD
Rubiaceae	<i>Otiophora angustifolia</i>		LR-lc
Rubiaceae	<i>Oldenlandia robinsonii</i>		DD
Rubiaceae	<i>Oldenlandia geophila</i>		VU
Rubiaceae	<i>Oldenlandia corymbosa</i> var. <i>corymbosa</i>		DD
Rubiaceae	<i>Psychotria mwinilungae</i>		VU
Rubiaceae	<i>Hallea stipulosa</i>		VU
Rubiaceae	<i>Rytigynia</i> sp. <i>A</i>		DD
Rutaceae	<i>Vepris mendoncana</i>		LR-lc
Rutaceae	<i>Vepris termitaria</i>	Endemic	VU
Rutaceae	<i>Vepris fanshawei</i>	Endemic	DD
Salicaceae	<i>Scolopia stoltzii</i>		DD
Sapindaceae	<i>Blighia unijugata</i>		LR-nt
Sapindaceae	<i>Deinbollia fanshawei</i>	Endemic	LR-lc
Sapindaceae	<i>Eriocoelum lawtonii</i>	Endemic	LR-lc
Sapotaceae	<i>Chrysophyllum bangweolense</i>		LR-lc
Scrophulariaceae	<i>Selago thyrsoidea</i> var. <i>thyrsoidea</i>	Near-endemic	DD
Scrophulariaceae	<i>Micrargeriaella aphylla</i>	Endemic	VU
Sterculiaceae	<i>Sterculia africana</i>		LR-lc
Sterculiaceae	<i>Sterculia quinqueloba</i>		LR-lc
Sterculiaceae	<i>Sterculia subviolacea</i>		LR-lc

Sterculiaceae	<i>Dombeya wittei</i>		VU
Sterculiaceae	<i>Triplochiton zambesiacus</i>		LR-lc
Sterculiaceae	<i>Sterculia tragacantha</i>		LR-lc
Tecophilaeaceae	<i>Walleria nutans</i>		LR-lc
Tecophilaeaceae	<i>Walleria mackenziei</i>		LR-lc
Tecophilaeaceae	<i>Cyanastrum johnstonii</i>		LR-lc
Tiliaceae	<i>Triumfetta tenuipedunculata</i>		LR-lc
Tiliaceae	<i>Triumfetta grandistipulata</i>		DD
Tiliaceae	<i>Corchorus saxatilis</i>		LR-lc
Tiliaceae	<i>Triumfetta reticulata</i>		DD
Turneraceae	<i>Streptopetalum luteoglandulosum</i>		VU
Urticaceae	<i>Pouzolzia bracteosa</i>		DD
Velloziaceae	<i>Xerophyta villosa</i>		LR-nt
Vitaceae	<i>Cissus fanshawei</i>		LR-lc
Vitaceae	<i>Cyphostemma nanellum</i>		DD
Vitaceae	<i>Cyphostemma tenuissimum</i>		DD
Vitaceae	<i>Cyphostemma saxicola</i>		LR-lc
Vitaceae	<i>Cyphostemma rotundistipulatum</i>		VU
Vitaceae	<i>Cyphostemma richardsiae</i>		LR-lc
Vitaceae	<i>Cyphostemma abercornense</i>		VU
Zamiaceae	<i>Encephalartos schmitzii</i>		VU
Zingiberaceae	<i>Siphonochilus pleianthus</i>		LR-nt

Appendix 3B: Endemic and threatened mammal species in Zambia

Ansell (1978) and Stuart *et al* (1990) have identified five (5) mammals known to be endemic to Zambia.

No	Scientific name	Common name
1	<i>Kobus leche smithemani</i>	Black Lechwe
2	<i>Kobus leche kafuensis</i>	Kafue Lechwe
3	<i>Connochaetes taurinus cooksoni</i>	Cookson's Wildebeest
4	<i>Giraffa camelopardalis thornicrofti</i>	Thornicroft's Giraffe
5	<i>Mus neavei</i>	Pygmy mouse

Threatened species of mammals found in Zambia.

No	Scientific name	Common name
1	<i>Diceros bicornis</i>	Black Rhinoceros
2	<i>Loxodonta African</i>	African Elephant
3	<i>Lycaon pictus</i>	Wild Dog
4	<i>Hippotragus equinus</i>	Roan Antelope
5	<i>Kobus leche kafuensis</i>	Kafue Lechwe

6	<i>Kobus leche smithemani</i>	<i>Black Lechwe</i>
7	<i>Alcelaphus lichtensteini</i>	<i>Lichtenstein's Hartebeest</i>
8	<i>Plerotes anchietae</i>	<i>Broad Faced Fruit Bat</i>
9	<i>Crocidura ansellorum</i>	<i>Pygmy Shrew</i>
10	<i>Rhynchocyton cirnei</i>	<i>Checkered Elephant Shrew</i>
11	<i>Mus neavei</i>	<i>Pygmy Mouse</i>
12	<i>Beamys major</i>	<i>Greater Hamster Rat</i>

Appendix 3C: List of threatened Bird species

NO	SCIENTIFIC NAME	COMMON NAME	IUCN STATUS
1	<i>Phoeniconaias minor</i>	Lesser Flamingo	NT
2	<i>Ephippiorhynchus senegalensis</i>	Saddle-Billed Stork	NT
3	<i>Balaeniceps rex</i>	Shoebill	VU
4	<i>Egretta vinaceigula</i>	Slaty Egret	VU
5	<i>Sagittarius serpentarius</i>	Secretarybird	EN
6	<i>Aquila rapax</i>	Tawny Eagle	VU
7	<i>Gyps africanus</i>	African White-Backed Vulture	CR
8	<i>Gyps coprotheres</i>	Cape Vulture	VU
9	<i>Terathopus ecaudatus</i>	Bateleur	EN
10	<i>Aquila nipalensis</i>	Steppe Eagle	EN
11	<i>Circus macrourus</i>	Pallid Harrier	NT
12	<i>Polemaetus bellicosus</i>	Martial Eagle	EN
13	<i>Necrosyrtes monachus</i>	Hooded Vulture	CR
14	<i>Trigonoceps occipitalis</i>	White-Headed Vulture	CR
15	<i>Torgos tracheliotos</i>	Lappet-Faced Vulture	EN
16	<i>Ardeotis kori</i>	Kori Bustard	NT
17	<i>Neotis denhami</i>	Stanley Bustard	NT
18	<i>Balearica regulorum</i>	Grey Crowned-Crane	EN
19	<i>Gallinago media</i>	Great Snipe	NT
20	<i>Numenius arquata</i>	Eurasian Curlew	NT
21	<i>Calidris ferruginea</i>	Curlew Sandpiper	VU
22	<i>Bucorvus leadbeateri</i>	Southern Ground-Hornbill	VU
23	<i>Bugeranus carunculatus</i>	Wattled Crane	VU

Appendix 4: Land Title

LANDS REGISTER					
Property number KAZU/1980					
ENTRY NO. 1	DATE OF DOC	29/05/2015	DATE OF REG	29/05/2015	
LESSOR	THE PRESIDENT OF ZAMBIA				
LESSEE	VICTORIA FALLS UNIVERSITY OF TECHNOLOGY LIMITED				
NATURE OF DOC	STATE LEASE FOR 99 YEARS FROM 01/05/2011 WITH AREA SIZE OF 100.0072 HECTARES				
				AREA	0.9999 Ha
ENTRY NO. 2	DATE OF DOC	29/05/2015	DATE OF REG	29/05/2015	
TITLE HOLDER	VICTORIA FALLS UNIVERSITY TECHNOLOGY LIMITED				
NATURE OF DOC	CERTIFICATE OF TITLE NO. CT_8556				
				AREA	0.9999 Ha
ENTRY NO. 3	DATE OF DOC	17/03/2021	DATE OF REG	17/03/2021	
1st PARTY	VICTORIA FALLS UNIVERSITY TECHNOLOGY LIMITED				
2nd PARTY	VICTORIA FALLS UNIVERSITY TECHNOLOGY LIMITED				
NATURE OF DOC	APPLICATION OF SEPARATE CERTIFICATE OF TITLE OF SUBDIVISION A				
				AREA	52.9988 Ha
ENTRY NO. 4	DATE OF DOC	17/03/2021	DATE OF REG	17/03/2021	
TITLE HOLDER	VICTORIA FALLS UNIVERSITY TECHNOLOGY LIMITED				
NATURE OF DOC	CERTIFICATE OF TITLE NO. CT_94582				
				AREA	52.9988 Ha

Appendix 6: Curriculum Vitae of Key Personnel

CURRICULUM VITAE (CV)

Position Title and No.:	Environment and Social Development Specialist (Team Leader)
Name of Expert:	Robby Kasubika
Date of Birth:	16.10.1973
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or Diploma obtained
University of Edinburgh, Edinburgh, Scotland, UK	2005	MSc Environmental Sustainability
Copperbelt University, Kitwe, Zambia	2001	BSc Forestry
ITC, Enschede, Netherlands	2006	Certificate in Biodiversity and Landuse Modelling
ZASTI, Lusaka, Zambia	1996	Certificate in Meteorology
Zambia Forestry College, Kitwe, Zambia	1995	Diploma in Forestry

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2006 - present	Copperbelt University Lecturer – Environmental Management For references: Professor Royd Vinya, Dean – School of Natural Resources, royd.vinya@cbu.ac.zm , +260 961011783	Zambia	- Lecturing undergraduates in Environmental Management, Forest Resource Assessment, Research Methods - Research and consultancy - Supervision of undergraduate research projects
2004-2006	Forest Department Forest Extension Officer For references: Mr Ignius Makumba, Director, inmakumba@gmail.com , +260 966746841		- Designing Forest management plans for various forest reserves in Lusaka province - Carrying out forest awareness campaigns to promote sustainable management of forests
2001-2003	Meteorological Department Agrometeorologist For references: MrEdson Nkonde, Director, chiluf@gmail.com , +260 950447111,		- Monitoring and evaluation of forest community based projects implemented by the various district forest offices in the province - Production crop-weather bulletins every after ten days for farmers - Participation in the vulnerability assessments and surveys that were conducted every year by the

			department in collaboration with World Food Programme (WFP) and Disaster Management Unit Weather and Climate analysis and dissemination of daily weather forecasts
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Membership in Professional Associations and Publications:

Institution	Registration/ Publication
	Membership No.
Environmental Education Association of Southern Africa	015534 NPO
Wildlife and Environmental Society of Zambia	
Forestry and Environmental Institute of Zambia	
Wildlife and Environmental Society of Zambia	
Population-Environment Research Network	

International publications and conferences (selection) :

Year	Title	Author / Co-Authors	Reference
2016	Energy Production from Forest and Agricultural Solid Waste	Kasubika, R., & Ng'andwe, P.	Book Chapter in Sustainable Livelihoods in the Green Economy
2016	Environmental Impacts of Industrial Renewable Energy Production	Ng'andwe, P., Kasubika, R., & Fushike, P.	Book Chapter in Sustainable Livelihoods in the Green Economy
2016	The implication of using a fixed form factor in areas under different rainfall and soil conditions for Pinus Kesiya in Zambia	Phiri, D., Phiri, E., Kasubika, R., Zulu, D., & Chisala, L.	Journal of Forest Science
2013	Drivers of Deforestation and Potential for Carbon Trading in Miombo Woodlands	Vinya, R., Syampungani, S., Kasumu, E.C., Kasubika, R. & Monde, C.	Book Chapter in Woodlands: Structure, Species Diversity and Sustainable Management
2011	Preliminary study on the drivers of deforestation and potential for REDD+ in Zambia	Vinya, R., Syampungani, S., Kasumu, E.C., Monde, C. & Kasubika, R.	Consultancy Report for FAO
2008	Participatory Forest Resource Assessment Training Guide: Training Manual for WWF-SARPO Songwe River Transboundary Catchment Management Project (SRTCMP).	Kasubika, R. and P.W. Matakala	ISBN 978-9982-9942-2-5

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Very Good	Very Good	Good
Tonga	Good	Good	Good

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts	Reference to Prior Work/Assignments that Best Illustrate Capability to Handle the Assigned Tasks
• Prepare EPB's for submission to ZEMA based on detailed design • Prepare EIS' and EMP's where required by ZEMA • Prepare monitoring procedures for checking/confirming EMPs. • Submission of reports to ZEMA as and when required. • Monitor compliance with approved EIS's and EMP's • Monitor the construction work of the contractor for compliance with EPB and ZEMA regulation • Prepare monthly summaries of onsite findings and any deviation or changes to the EMP.	- selected projects -
	Environmental and Social Impact Assessment (ESIA) Year: 2021 <i>Location:</i> Chingola, Chililabombwe and Mufulira Districts, Zambia <i>Client:</i> Mulonga Water Supply and Sanitation Company <i>Main Project Features:</i> Preparation of an Environmental and Social Impact Assessment for the Zambia Water and Sanitation Project <i>Position:</i> Lead Consultant <i>Activities:</i> Preparation of Scoping Report, Baseline Studies, • Compilation of the ESIA Report • Preparation of Environmental Management Plan (EMP). • Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA • Meeting with ZEMA to discuss TORs and Scoping Report • Communicating with ZEMA on the progress of the whole ESIA • Attending to ZEMA concerns during site inspection • Periodical meetings with ZEMA inspectors on updates and issues concerning the project • Worked with ZEMA staff during public hearing for the project • Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA •
	Environmental and Social Impact Assessment (ESIA) Year: 2021- Ongoing <i>Location:</i> Serenje, Central Province, Zambia <i>Client:</i> M.L Paton Investments Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment report for the existing Commercial Farming Project <i>Position:</i> Lead Consultant <i>Activities:</i> • Technical Assessment of Project • Stakeholder Engagement • Baseline Studies including site verification

	• Compilation of the ESIA Report • Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2017 <i>Location:</i> Luangwa, Lusaka Province, Zambia <i>Client:</i> Luangwa Bridge Fish Farm Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for proposed Fish Farm Project in Luangwa District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2014 <i>Location:</i> Kafue, Lusaka Province, Zambia <i>Client:</i> Luangwa Bridge Fish Farm Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for proposed Integrated Fish Farming Project in Kafue District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from

	EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2017 <i>Location:</i> Serenje, Central Province, Zambia <i>Client:</i> Great North Ranching Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for proposed construction of fish ponds on Sherrifs Estate in Serenje District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP)
	Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) <i>Year:</i> 2017 <i>Location:</i> Copperbelt Province, Zambia <i>Client:</i> Copperbelt Energy Corporation (CEC) <i>Main Project features:</i> Proposed 66kV Transmission line from Ndola Refinery Substation to Dangote Cement Plant in Masaiti District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). Preparation of Resettlement Action Plan (RAP) Submitting of TORs and scoping report to ZEMA on behalf of client Following through with ZEMA on the progress on review of TORs, scoping report and draft ESIA Meeting with ZEMA to discuss TORs and scoping report Accompanying ZEMA inspectors during site inspection Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA

	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2013 <i>Location:</i> Zambia <i>Client:</i> Silverlands Ranching Limited <i>Main project features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed construction of a Dam inimba District, Southern Province (14,000, 000 m³) of water <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). Monitor compliance during construction. Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA Communication with Multilateral Investment Guarantee Agency (MIGA) inspectors during site inspection since the project was IFC funded Submission of
	Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> Luwombwa Irrigation Company <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed Irrigation Dam and Preparation of Resettlement Action Plan (RAP) in Serenje District, Central Province <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). Monitor compliance during construction. Preparation of Resettlement Action Plan (RAP) Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report

	Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Name of the Project: Environment and Social Impact Assessment for a proposed Modern Shopping Mall Year: 2016 Location: Lusaka, Zambia Client: Novare Main Project features: Preparation of an Environmental and Social Impact Assessment Position: Lead Consultant - Environmental and Social Development Expert Activities performed: - Preparation of Scoping report - Baseline studies - Compilation of the ESIA Report - Preparation of Environmental Management Plan (EMP). - Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA - Meeting with ZEMA to discuss TORs and Scoping Report - Communicating with ZEMA on the progress of the whole ESIA - Attending to ZEMA concerns during site inspection - Periodical meetings with ZEMA inspectors on updates and issues concerning the project - Monitor compliance during construction. - Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Name of the Project: Environment and Social Impact Assessment for a proposed Modern Shopping Mall Year: 2016 Location: Woodlands, Lusaka, Zambia Client: Vertigo Properties Limited Main Project features: Preparation of an Environmental and Social Impact Assessment Position: Lead Consultant - Environmental and Social Development Expert Activities performed: - Preparation of Scoping report - Baseline studies - Compilation of the ESIA Report - Preparation of Environmental Management Plan (EMP). - Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA - Meeting with ZEMA to discuss TORs and Scoping Report - Communicating with ZEMA on the progress of the whole ESIA - Attending to ZEMA concerns during site inspection - Periodical meetings with ZEMA inspectors on updates and issues concerning the project - Worked with ZEMA staff during public hearing for the project

	Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2016 <i>Location:</i> North-Western Province, Zambia <i>Client:</i> Rural Electrification Authority (REA) <i>Main project features:</i> Preparation of an environmental and Social Impact Assessment for proposed Kasanjiku 590MW Mini Hydro Power Project in Mwinilunga District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Monitor compliance during construction. Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental Project Briefs (EPB) <i>Year:</i> 2015 <i>Location:</i> Zambia <i>Client:</i> Rural Electrification Authority (REA) <i>Main project features:</i> Preparation of EPBs and associated EMP for thirteen grid extension sites (Mungwi, Kasama, Luwingu, Mpika and Kabwe, Mushindamo, Kabompo and Monze) <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA Meeting with ZEMA to discuss comments on draft EPBs Communicating with ZEMA on the progress of the whole process Attending to ZEMA concerns during site inspection Communicating with ZEMA on behalf of the client on the progress of EPB review Periodical meetings with ZEMA inspectors on updates and issues concerning the project Monitor compliance during construction. Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA

	Name of the Project: Environmental Project Brief for timber harvesting and processing projects in seventeen areas (some of the areas are Mpika, Shiwangandu, Mafinga, Chinsali, Isoka and Chama) Year: 2017 Location: Zambia Client: Various Companies (seventeen in total) Main project features: Preparation of EPBs and associated EMPs Position: Lead Consultant - Environmental and Social Development Expert Activities performed: Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA Meeting with ZEMA to discuss comments on draft EPBs Communicating with ZEMA on the progress of the whole process Accompanying ZEMA inspectors during site inspection/verification Communicating with ZEMA on behalf of the client on the progress of EPB review Periodical meetings with ZEMA inspectors on updates and issues concerning the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA Training in Environmental Impact Assessment Year: 2010 Location: Copperbelt Province, Zambia Client: Zambia Environmental Management Agency (ZEMA) Main project features: Training of Small scale mining companies staff in environmental impact assessment Position: Resource Person: Hired by ZEMA Activities performed: Training of small scale miners in Environmental Impact Assessment and Management. Was one of the resource person on the training of small scale miners on EIAs. Topics covered - introduction to EIA and EIA process in Zambia Developed training programme together with ZEMA staff Compiled training materials together with ZEMA staff.
	Statutory Compliance Audit of the Luezi Dam Project Year: 2017 Location: Southern Province, Zambia Client: Silverlands Ranching Limited Main Project features: Environmental Audit of the Luezi Dam Project Zimba District Position: Lead Consultant - Environmental and Social Development Expert Activities performed: Meeting with ZEMA to discuss the audit process Submission of audit report to ZEMA on behalf of the client

	Development of a Green Policy for the Bank of Zambia <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> Bank of Zambia <i>Position:</i> Consultant – Environmental Sustainability Expert
	Flora and Fauna Inventory for Solar Project Site <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> Copperbelt Energy Corporation (CEC) <i>Main project features:</i> Collecting baseline data on flora and fauna within the proposed for solar project site <i>Position:</i> Deputy Team Leader <i>Activities performed:</i> Designing of data collection tools and Training of data collectors and data input clerks
	Preparation of Strategic Environmental Impact Assessment (SEA) <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> Ministry of Youth and Sports Development <i>Main project features:</i> Baseline data collection on socioeconomic and biophysical environment for a Youth Resettlement Programme <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Supervising, Designing of data collection tools and Training of data collectors and data input clerks. Worked with ZEMA staff to develop the SEA report
	Socio Economic Survey For Resettlement Of Householders For An Agriculture Project <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> ECM Agri Limited <i>Main project features:</i> Collection of baseline data on socioeconomic status of the households in the project area <i>Position:</i> Consultant <i>Activities performed:</i> Supervising Designing of data collection tools and training of data collectors and data input clerks
	Resettlement Action Plan (RAP) <i>Year:</i> 2016 <i>Location:</i> Lufwanyama, Zambia <i>Client:</i> ECM Agri Limited <i>Main project features:</i> Preparation of the Resettlement Action Plan involving 14 households <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Conducting Scoping meetings, Negotiating Compensations, Compilation of the RAP.

	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2016 <i>Location:</i> Copperbelt Province, Zambia <i>Client:</i> Xanthium Dairies Zambia Limited <i>Main project features:</i> Preparation of an environmental and Social Impact Assessment for proposed Agriculture Project in Lufwanyama District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP).
	Environmental Project Brief (EPB) <i>Year:</i> 2016 <i>Location:</i> Copperbelt Province, Zambia <i>Client:</i> Hocean Mining Company <i>Main project features:</i> Preparation of EPBs and associated EMP for proposed Mini Copper Smelter plants in Kalulushi District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Coordinating the baseline assessment, Compilation of the various EPB reports and associated EMPs
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2015 <i>Location:</i> Central Province, Zambia <i>Client:</i> Silverlands Zambia Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed Conversion of Usage from Forestry to Row Cropping, Luwombwa Block, Serenje District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP).
	Environmental Project Brief (EPB) <i>Year:</i> 2016 <i>Location:</i> Copperbelt Province, Zambia <i>Client:</i> Hocean Mining Company <i>Main project features:</i> Preparation of EPBs and associated EMP for proposed Mini Copper Smelter plants in Kalulushi District <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Coordinating the baseline assessment, Compilation of the various EPB reports and associated EMPs

	Environmental and Social Impact Assessment (ESIA) Year: 2015 Location: Central Province, Zambia Client: Silverlands Zambia Limited Main Project features: Preparation of an Environmental and Social Impact Assessment for the proposed Conversion of Usage from Forestry to Row Cropping, Luwombwa Block, Serenje District Position: Lead Consultant - Environmental and Social Development Expert Activities performed: Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP).
	Updating of the Environmental and Social Impact Assessment (ESIA) Year: 2015 Location: Southern Province, Zambia Client: ZESCO Main project features: Updating of the Environmental Impact Assessment of Proposed Kafue Gorge Lower Power Station in Chikankata District Position: Local Experts Team Leader / Landuse Planner Activities performed: Updating of the ESIA, Flora and Fauna assessment, Landuse assessment.
	Environmental and Social Impact Assessment (ESIA) Year: 2015 Location: Copperbelt Province, Zambia Client: Kalulushi Dairies Zambia Limited Main project features: Preparation of an environmental and Social Impact Assessment for the proposed Milk Processing Factory Project in Chambishi Economic Zone, Kalulushi District, Position: Lead Consultant - Environmental and Social Development Expert Activities performed: Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan EMMP).
	Environmental and Social Impact Assessment (ESIA) Year: 2015 Location: Zambia Client: Induna Investment Limited Main project features: Preparation of an Environmental and Social Impact Assessment (ESIA) for the proposed Large Timber Concession Project in Kabompo District, Northwestern Province Position: Lead Consultant - Environmental and Social Development Expert Activities performed: Preparation of Scoping report Baseline studies Compilation of the ESIA Report

	Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA Environmental Project Brief (EPB) <i>Year:</i> 2013 <i>Location:</i> Zambia <i>Client:</i> Rural Electrification Authority (REA) <i>Main project features:</i> Preparation of EPBs and associated EMPs for grid extension projects in sixteen sites (some of the sites are Chembe, Mpika, Shiwangandu, Kawambwa, Mungwi, Chinsali, Monze, Kasempa, Solwezi, Luampa, Kalomo, Kabwe etc.) <i>Position:</i> Lead Consultant - Environmental and Social Development Expert <i>Activities performed:</i> Compilation of the EPB Reports, Preparation of Environmental Management and Monitoring Plan (EMMP) Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA Meeting with ZEMA to discuss comments on draft EPBs Communicating with ZEMA on the progress of the whole process Accompanying ZEMA inspectors during site inspection/verification Communicating with ZEMA on behalf of the client on the progress of EPB review Periodical meetings with ZEMA inspectors on updates and issues concerning the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental Assessment Course <i>Year:</i> 2010 <i>Location:</i> Zambia <i>Client:</i> Barrick Lumwana Mining Company <i>Main project features:</i> Training of Lumwana Mining Company staff in environmental assessment <i>Position:</i> Team Leader <i>Activities performed:</i> Vegetation assessment, Fauna assessment, Soil assessment, Climatic data collection, Water assessment

	Songwe River Transboundary Catchment Management Project <i>Year:</i> 2008 <i>Location:</i> Malawi, Tanzania <i>Client:</i> WWF <i>Main project features:</i> Training of communities in participatory forest resource assessment <i>Positions held:</i> Lead Facilitator <i>Activities performed:</i> Training 35 persons (community members and government officers) in participatory forest resource assessment Prepared the Participatory Forest Resource Assessment Guide
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Expert's contact information: e-mail: robbykasubika@gmail.com phone: +260 979319871/+260 962887249

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualification, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client, and/or sanctions by ZPPA.

Robby Kasubika

16/06/2022



Name of Expert

Signature

Date

CURRICULUM VITAE (CV)

Name:	Claired Kipuputwa
Specialization:	Environmental management expert
Date of Birth:	22.08.1981
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or Diploma obtained
Nelson Mandela Metropolitan University, Saasveld, George, South Africa	2010	MTech Forestry
Nelson Mandela Metropolitan University, Saasveld, George, South Africa	2008	BTech Wood Science & Technology
Nelson Mandela Metropolitan University, Saasveld, George, South Africa	2007	Certificate in Advanced Geographic Information Systems
Copperbelt University, Kitwe, Zambia	2006	BSc Wood Science & Technology
University of Zambia	2001	Certificate in Sales & Marketing Management

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2010 - present	Copperbelt University Lecturer – Timber Structural Design & Construction, Wood Degradation & Protection, Pulp & Paper Technology For references: Dr Francis Munalula, HoD – School of Natural Resources, Francis.munalula@cbu.ac.zm , +260 960453039	Zambia	- Lecturing in structural mechanics, structural design, wood-based panel technology, wood preservation and paper technology - Research and consultancy - Supervision of undergraduate research projects - Carrying out forest awareness campaigns to promote sustainable management of forests
2005-2006	Copperbelt Forestry Company as Assistant Production Manager:		Daily planning, implementation and supervision of sawmill, pol/timber treale/timber treatment, carpentry and logging operations.

Membership in Professional Associations and Publications:

Institution	Registration/ Publication
Forestry and Environmental Institute of Zambia	

International publications and conferences (selection):

Year	Title	Author / Co-Authors	Reference
2008	Use of Near-Infrared Spectroscopy to Predict Wood Properties	Kipuputwa CS, Louw JL	

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Very Good	Very Good	Very Good
Kaonde	Very Good	Very Good	Very Good

Some Consultancy Work Undertaken:

Environmental and Social Impact Assessment (ESIA) Year: 2014 Location: Kafue, Lusaka Province, Zambia Client: Luangwa Bridge Fish Farm Limited Main Project features: Preparation of an Environmental and Social Impact Assessment for proposed Integrated Fish Farming Project in Kafue District Position: Consultant – Environmental Expert Activities performed: Preparation of Scoping Report, Baseline Studies and ESIA Report.
Environmental and Social Impact Assessment (ESIA) Year: 2017 Location: Serenje, Central Province, Zambia Client: Great North Ranching Limited Main Project features: Preparation of an Environmental and Social Impact Assessment for proposed construction of fish ponds on Sherrifs Estate in Serenje District Position: Consultant – Environmental Expert Activities performed: Preparation of Scoping Report, Baseline Studies (soil and water sample collection) and writing of the ESIA Report
Environmental and Social Impact Assessment (ESIA) Year: 2013 Location: Zambia Client: Silverlands Ranching Limited Main project features: Preparation of an Environmental and Social Impact Assessment for the proposed construction of a Dam in Zimba District, Southern Province (14,000, 000 m³) of water Position: Consultant – Environmental Expert Activities performed: - Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). - Ecological assessment

Preparation of TORs, scoping report, draft ESIA and final ESIA to ZEMA
Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) <i>Year:</i> 2017 <i>Location:</i> Zambia <i>Client:</i> Luwombwa Irrigation Company <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed Irrigation Dam and Preparation of Resettlement Action Plan (RAP) in Serenje District, Central Province <i>Position:</i> Consultant - Environmental Expert <i>Activities performed:</i> - Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP). - Attending to ZEMA concerns during site inspection
Environmental Project Briefs (EPB) <i>Year:</i> 2015 <i>Location:</i> Zambia <i>Client:</i> Rural Electrification Authority (REA) <i>Main project features:</i> Preparation of EPBs and associated EMP for thirteen grid extension sites (Mungwi, Kasama, Luwingu, Mpika and Kabwe, Mushindamo, Kabompo and Monze) <i>Position:</i> Consultant - Environmental Expert <i>Activities performed:</i> Participation in the preparation of baseline assessment and EPBs
Name of the Project: Environmental Project Brief for timber harvesting and processing projects in seventeen areas (some of the areas are Mpika, Shiwangandu, Mafinga, Chinsali, Isoka and Chama) Year: 2017 Location: Zambia Client: Various Companies (seventeen in total) Main project features: Preparation of EPBs and associated EMPs Position: Consultant - Environmental Expert Activities performed: Participation in the baseline assessment, Compilation of the various EPBs and associated EMPs.
Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2015 <i>Location:</i> Central Province, Zambia <i>Client:</i> Silverlands Zambia Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed Conversion of Usage from Forestry to Row Cropping, Luwombwa Block, Serenje District <i>Position:</i> Consultant - Environmental Expert <i>Activities performed:</i> - Preparation of Scoping Report, Baseline Studies, - Compilation of the ESIA Report, Preparation of
Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2015 <i>Location:</i> Central Province, Zambia

<i>Client:</i>	Silverlands Zambia Limited
<i>Main Project features:</i>	Preparation of an Environmental and Social Impact Assessment for the proposed Conversion of Usage from Forestry to Row Cropping, Luwombwa Block, Serenje District
<i>Position:</i>	Consultant - Environmental Expert
<i>Activities performed:</i>	• Preparation of Scoping Report, Baseline Studies, • Compilation of the ESIA Report,.
Environmental and Social Impact Assessment (ESIA)	
<i>Year:</i>	2015
<i>Location:</i>	Zambia
<i>Client:</i>	Induna Investment Limited
<i>Main project features:</i>	Preparation of an Environmental and Social Impact Assessment (ESIA) for the proposed Large Timber Concession Project in Kabompo District, Northwestern Province
<i>Position:</i>	Consultant - Environmental Expert
<i>Activities performed:</i>	• Preparation of Scoping report • Participated in the Baseline studies writing of the ESIA Report • Worked with ZEMA staff during public hearing for the project
Environmental Project Brief (EPB)	
<i>Year:</i>	2013
<i>Location:</i>	Zambia
<i>Client:</i>	Rural Electrification Authority (REA)
<i>Main project features:</i>	Preparation of EPBs and associated EMPs for grid extension projects in sixteen sites (some of the sites are Chembe, Mpika, Shiwangandu, Kawambwa, Mungwi, Chinsali, Monze, Kasempa, Solwezi, Luampa, Kalomo, Kabwe etc.)
<i>Position:</i>	Consultant - Environmental and Social Development Expert
<i>Activities performed:</i>	• Preparation of the EPB Reports the baseline assessment, Compilation of the various EPBs and associated EMPs.

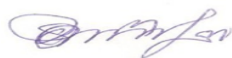
Expert's contact information: e-mail: clairedks@gmail.com

phone: +260 973699711

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience.

Claired S. Kipuputwa



01.07.2022

Name of Expert

Signature

	Vivian Omega Mwale General Manager & Stakeholder Engagement Expert Education and Qualifications: •MSc Candidate Computer Science (Climate Change), Copperbelt University, Zambia (Expected 2028) •Bachelor of Computer Science, Copperbelt University, Zambia (2012) •Certificate in Introduction to Environmental and Social Impact Assessments, Kasumwa Enviroconsult and General Supplies, Zambia (2024) •Certificate in Content Creation, Digital Savvypro Academy (2024) •Certificate in American Sign Language, Copperbelt University, Zambia (2012) •Certificate in Android Programming, Copperbelt University, Zambia (2011) •Certificate of Completion in Computer Studies, David Kaunda National Technical High School, Zambia (2007) Countries of Work Experience: Zambia Sectoral / Thematic Experience: General Management, Stakeholder Engagement & Planning, Operations Management, IT Infrastructure & Cybersecurity, Project Management, Environmental and Social Impact Assessments (ESIA), Strategic Environmental Assessments (SEA), Digital Marketing, Financial Trading & Data Analysis, Team Leadership & Training.
Summary of Relevant Experience: Vivian Omega Mwale is an accomplished General Manager and Stakeholder Engagement Expert with extensive experience in organizational leadership, strategic planning, and technology-driven business optimization. Currently serving as the General Manager at Kasumwa Enviroconsult and General Supplies (KEGS), she excels in fostering high-level stakeholder relationships and overseeing complex project lifecycles. Her expertise integrates advanced IT infrastructure management with a specialized focus on the environmental sector, particularly in the preparation of Strategic Environmental Assessments (SEAs) for large-scale carbon projects such as the Kafue Zambezi Community Forest Project and World Vision's CIRCLE Project. Vivian is adept at bridging the gap between technical execution and community engagement, leveraging her background in Computer Science and ongoing research in Climate Change to provide data-driven insights for environmental governance. A proven leader and mentor, she has a distinguished track record of driving operational excellence and sustainable growth across the consultancy, financial, and technology sectors.	
Key Selected Experience:	

- **October 2025 – Present - Strategic Environmental and Social Assessment (SESA) for the Community Initiated Regeneration for Carbon and Livelihood Enhancement (CIRCLE) Project in 2 districts of Luapula Province, Zambia:** The project being implemented by World Vision Zambia Limited (WVZL) in Chipili and Chifunabuli Districts. As a Stakeholder Engagement and Planning Expert, Vivian leads high-level consultations with government bodies, international partners, and local communities to ensure project alignment and regulatory compliance.
- **June 2025 – November 2025- Strategic Environmental Assessment (SEA) for the REDD+ Kafue Zambezi Community Forest Project (KZCFP) in 15 districts of Zambia’s Southern province (Phase 2):** The KZCFP is potentially one of the world’s largest REDD+ project by size and people benefitting with an initial 2.65 million hectares, reducing +/- 3 million tons of emissions per year and to benefit over 400,000 people directly in the project area. As a Stakeholder Engagement and Planning Expert, Vivian leads high-level consultations with government bodies, international partners, and local communities to ensure project alignment and regulatory compliance. Her role also includes key data collection and analysis during baseline studies and Preparation of scoping reports, and SEA reports for this REDD+ carbon project across 15 districts in Southern Province, and supported the development of sustainable forest management practices.
- **October 2024 – February 2025 - Strategic Environmental Assessment (SEA) for the REDD+ Lavushimanda Community Conservation Project in Muchinga Province by WeForest Zambia.** This project involves the generation of carbon credits through reduced deforestation and forest degradation. The total estimated conservative net emissions reductions (NERs) are 1,409,800 tCO₂e for a 40-year crediting period, i.e., an average of 35,245 tCO₂e per year. As a Stakeholder Engagement and Planning Expert, Vivian leads high-level consultations with government bodies, international partners, and local communities to ensure project alignment and regulatory compliance.
- **January – June 2024 - Strategic Environmental Assessment (SEA) for the REDD+ Kafue Zambezi Community Forest Project (KZCFP) in 16 districts of Zambia’s Western province (Phase 1):** The KZCFP is potentially one of the world’s largest REDD+ project by size and people benefitting with an initial 2.65 million hectares, reducing +/- 3 million tons of emissions per year and to benefit over 400,000 people directly in the project area. As a Stakeholder Engagement and Planning Expert, Vivian leads high-level consultations with government bodies, international partners, and local communities to ensure project alignment and regulatory compliance.
- **Environmental and Social Impact Assessment (ESIA) for the proposed Miloso Dam and Bulk Water Reticulation Project and associated Resettlement and Compensation Action Plan (RCAP) in Mkushi District in November 2024:** The Miloso Dam is set to be the biggest dam in Mkushi District of Zambia. Vivian actively participated in biophysical and socio-economic baseline assessment studies, stakeholder mapping, and engagement processes. She also participated in conducting the census of Project-Affected Persons (PAPs) and played a key role in the preparation of the Resettlement and Compensation Action Plan (RCAP) and the Environmental and Social Impact Assessment (ESIA) reports.
- **Environmental Project Brief for the proposed Rural Electrification Project - in 13 districts across 8 provinces of Zambia in 2015:** Vivian played a key role in the preparation of the Environmental Project Briefs (EPBs) and associated Environmental Management Plans (EMPs) for the 13 districts including

Kalomo (Dimbwe Mission), Luampa, Mpongwe (Mwinuna), Kabwe (Mulungushi Agro), Mufulira (Orashio), Solwezi (Mushindamo), Kasempa (Kankolonkolo), Chembe (Chembe Schools), Milenge, Kawambwa (Kala), Mungwi (Kayambi Village), Chinsali (Mundu Phase III), and Mpika (Mpepo). Her involvement in baseline assessments, stakeholder mapping, and engagement activities provided him with extensive experience in assessing the environmental and social dimensions of rural electrification initiatives.

- **Environmental Project Brief for timber harvesting and processing projects in seventeen Districts (some of the areas are Mpika, Shiwangandu, Mafinga, Chinsali, Isoka and Chama):** She participated in the baseline assessment, Compilation of the various EPBs and associated EMPs for 17 different companies in 2017. Applied precision forestry techniques to optimize sustainable harvesting, minimizing environmental impact and promoting renewable resource use.
- **Energy Preparation of an Environmental and Social Impact Assessment (ESIA) for the proposed Large Timber Concession Project in Kabompo District, Northwestern Province:** She conducted detailed impact studies of the proposed harvesting operations on the landscape and prepared an effective Environmental and Social Management Plan to mitigate the impact and helped evaluate the emissions footprint of wood harvesting, processing, and utilization to recommend eco-friendly practices.

Signature:



Date: 18/06/2026

CURRICULUM VITAE

Position Title and No.:	Ecologist
Name of Expert:	Tom Kamanga
Date of Birth:	13.04.1973
Country of Citizenship/ Residence:	Zambia

EDUCATION BACKGROUND:

Institution	Date	Degree(s) or Diploma obtained
University of Zambia in association with Zambia Forestry College, Kitwe, Zambia.	2019	Bachelor's Degree in Forestry
AWM University College, Kitwe, Zambia	2012	Bachelor's Degree in Agriculture and Rural Development
AWM University College, Kitwe, Zambia	2012	Certificate in Psychosocial Counselling
Wildlife Conservation School, Kafue National Park, Mumbwa, Zambia.	1996	Certificate in Environmental Education
Zambia Forestry College, Kitwe, Zambia	1995	Diploma in Forestry

EMPLOYMENT RECORD

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2013 - present	Copperbelt University Technician – For references: Professor Royd Vinya, Dean – School of Natural Resources, royd.vinya@cbu.ac.zm , +260 961011783, Kitwe	Zambia	• Taking students for field practical in Botany tree identification and Forest Resources Assessments and Silvicultural operations. • Assisting in Research and consultancy works • Assisting lecturers during examination invigilation and teaching specified practical topics. • <i>Preparation of samples for use by lecturers and students doing research programs</i>

2010-2012	Zambia Forestry College Mwekera Kitwe. Instructor For references: Mr Fred Mulenga, Former Principal, fredmulenga@gmail.com , +260 966746841, Lusaka	Zambia	- Lecturing Wood harvesting, Sawmilling, forest resources assessment. - Preparation and marking of tests, assignments and final exams for the courses taught. - Taking and organizing students for field operations. - Supervision of some final year students doing projects in forestry management.
2008-2010	Copperbelt Forestry Company Kitwe- Senior Manager For references: Mr Johnson Sichinga, Director, chiluf@gmail.com , +260 950447111, Lusaka	Zambia	- Designing Plantation management plans in order to promote sustainability of forests and environment - In charge of logging, sawmilling, Engineering, Marketing of the station and thereby advising the Managing Director on how best to run the company.
2006-2008	Wood processing Industries(WPI) Ndola- Senior Manager Refernce Director Mr RL Patel Tel: 650889	Zambia	- In -charge of Plantation and wood harvesting activities at WPI.
1996-2006	Wood processing Industries(WPI) Ndola	Zambia	In charge of Felling, Snedding, Crosscutting and Extraction of raw materials at the Plantation.

Membership in Professional Associations and Publications:

Institution	Registration/ Publication
	Membership No.
Forestry Institute and Environment in Zambia	015534 NPO

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Very Good	Very Good	Good
Tumbuka	Good	Good	Good

Detailed Tasks Assigned on Consultants Team of Experts	Reference to Prior Work/Assignments that Best Illustrates Capability to Handle the Assigned Tasks
	Environmental Project Brief (EPB) <i>Location:</i> Samfya <i>Year:</i> 2019 <i>Client:</i> Luapula Water and Sewarage Company <i>Position:</i> Ecologist <i>Main feature of the project t:</i> Environmental Project Brief for the integrated small towns water supply and sanitation project <i>Responsibilities:</i> • Flora and fauna surveys • Writing flora and fauna reports
	Environmental Project Brief (EPB) <i>Location:</i> Kawambwa <i>Year:</i> 2019 <i>Client:</i> Luapula Water and Sewarage Company <i>Position:</i> Ecologist <i>Main feature of the project t:</i> Environmental Project Brief for the integrated small towns water supply and sanitation project <i>Responsibilities:</i> • Flora and fauna surveys • Writing flora and fauna reports
	Environmental Project Brief (EPB) <i>Location:</i> Mwense <i>Year:</i> 2019 <i>Client:</i> Luapula Water and Sewarage Company <i>Position:</i> Ecologist <i>Main feature of the project t:</i> Environmental Project Brief for the integrated small towns water supply and sanitation project <i>Responsibilities:</i>

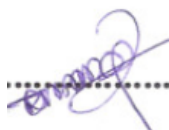
	• Flora and fauna surveys • Writing flora and fauna reports
	Environmental Project Brief (EPB) <i>Location:</i> Mansa <i>Year:</i> 2019 <i>Client:</i> Luapula Water and Sewerage Company <i>Position:</i> Ecologist <i>Main feature of the project:</i> Environmental and Social Impact Assessment report for the integrated small towns water supply and sanitation project <i>Responsibilities:</i> • Flora and fauna surveys • Writing flora and fauna reports
	Environmental Project Brief (EPB) Environmental Project Brief (EPB) <i>Location:</i> Luwingu <i>Year:</i> 2018 <i>Client:</i> Ministry of Agriculture <i>Position:</i> Ecologist <i>Main feature of the project:</i> Environmental and Social Impact Assessment report for the construction of Ntamba Luena Dam in Luwingu District, Northern Province <i>Responsibilities:</i> • Flora and fauna surveys Writing flora and fauna reports
	Environmental and Social Impact Assessment (ESIA) <i>Location:</i> Luwingu <i>Year:</i> 2017 <i>Client:</i> Luangwa Bridge Fish Farm <i>Position:</i> Ecologist

	<i>Main feature of the project:</i> Environmental and Social Impact report for a fish farm project <i>Responsibilities:</i> • Flora surveys Social and economic surveys. • Writings minutes during scoping and disclosure meetings.
	Environmental and Social Impact Assessment (ESIA) <i>Location:</i> Kafue <i>Year:</i> 2012 <i>Client:</i> Kaue Fisheries Limited <i>Position:</i> Ecologist <i>Main feature of the project:</i> Environmental and Social Impact report for a fish farm project <i>Responsibilities</i> • Flora surveys Social and economic surveys. • Writings minutes during scoping and disclosure meetings.
	Environmental Impact Assessment <i>Location:</i> Kitwe <i>Year:</i> 2018 <i>Client:</i> Copperbelt Energy Corporation <i>Position:</i> Ecologist <i>Main feature of the project:</i> Environmental Project Brief report for the proposed Solar Project by Copperbelt Energy Corporation (CEC) <i>Responsibilities</i> • Responsibility for review of the legal framework relevant to the project
	Environmental and Social Impact Assessment <i>Location:</i> Kitwe <i>Year:</i> 2017 <i>Client:</i> KEGS <i>Position:</i> Ecologist <i>Main feature of the project:</i> Environmental and Social Impact Assessment Report for the proposed expansion of centre pivots and construction of fish ponds <i>Responsibilities:</i>

	• Flora and fauna surveys • Review of legal framework relevant to the project
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CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client and/or sanction by ZPPA.



Tom Kamanga

16.06.2022

Name of Expert

CURRICULUM VITAE (CV)

Position Title and No.:	Environmental Engineer
Name of Expert:	Twange Maluba
Date of Birth:	25.04.1996
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or certificate obtained
Copperbelt University, Kitwe, Zambia	2015-2020	Bachelor of Engineering in Environmental Engineering
Luanshya Girls secondary School	2013	Full Grade 12 certificate

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2019-present	Kasumwa EnviroConsult and General Supplies Limited – Environmental Officer For references: Robby Kasubika, Director – Technical robbykasubika@gmail.com, +260 979319871	Zambia	• Environmental and Social Impact Assessments • Preparation of Environmental and Social Management Plans (ESMPs) • Development of Legal Compliance Registers • Preparation of Health, Safety and Environmental Management Systems • Compilation of audit reports • Facilitating compliance monitoring and auditing on development projects • Implementation of site and community waste management programs • Preparation of Stakeholder Engagement Plans and operationalisation of these plans • Developing Grievance Redress Mechanisms • Compilation of Environmental and Social Impact Assessment (

Membership in Professional Associations and Publications:

Institution	Registration/ Publication
	Membership No.
Engineering Institute of Zambia	

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Very Good	Very Good	Good

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts	Reference to Prior Work/Assignments that Best Illustrate Capability to Handle the Assigned Tasks
• Prepare EPB's for submission to ZEMA based on detailed design • Prepare EIA's and EMP's where required by ZEMA • Prepare monitoring procedures for checking/confirming EMPs. • Submission of reports to ZEMA as and when required. • Monitor compliance with approved EAI's and EMP's • Monitor the construction work of the contractor for compliance with EPB and ZEMA regulation • Prepare monthly summaries of onsite findings and any deviation or changes to the EMP.	- selected projects - Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2021- Ongoing <i>Location:</i> Serenje, Central Province, Zambia <i>Client:</i> M.L Paton Investments Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment report for the existing Commercial Farming Project <i>Position:</i> Environmental Engineer <i>Activities:</i> • Technical Assessment of Project • Stakeholder Engagement • Baseline Studies including site verification • Compilation of the ESIA Report • Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2021 <i>Location:</i> Chingola, Chililabombwe and Mufulira Districts, Zambia <i>Client:</i> Mulonga Water Supply and Sanitation Company <i>Main Project Features:</i> Preparation of an Environmental and Social Impact Assessment for the Zambia Water and Sanitation Project <i>Position:</i> Environmental Engineer <i>Activities:</i> • Technical Assessment of the Project • Stakeholder Engagement • Baseline Studies including site verification • Compilation of the ESIA Report • Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP) • Meeting with ZEMA to discuss TORs and Scoping Report
	Environmental and Social Impact Assessments

	<i>Year:</i> 2021 <i>Location:</i> Kabompo, North-Western Province, Zambia <i>Client:</i> Lecika Timber Investments Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment report for the Upgrade of a Timber Concession License <i>Position:</i> Environmental Engineer <i>Activities:</i> • Technical Assessment of the Project • Stakeholder Engagement • Baseline Studies • Compilation of the ESIA Report • Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP) Environmental and Social Impact Assessment <i>Year:</i> 2021 <i>Location:</i> Chingola, Zambia <i>Client:</i> China Henan International Cooperation <i>Main Project Features:</i> Environmental Project Brief (EPB) for the establishment of Campsites <i>Position:</i> Environmental Engineer <i>Activities:</i> • Baseline Studies • Compilation of Environmental and Social Impact Assessment (ESIA) Report • Preparation of Environmental Management Plan (EMP). • Communicating with ZEMA on the progress of the whole EPB Environmental and Social Impact Assessment (ESIA) <i>Year :</i>2019 <i>Location:</i> Mansa, Mwense, Samfya, Kawambwa Zambia <i>Client:</i> Luapula Water Supply and Sanitation Company <i>Main Project Features:</i> Preparation of an Environmental and Social Impact Assessment for Integrated Small Towns Water Supply and Sanitation Project <i>Position:</i> Environmental Engineer: • Technical Assessment of the Project • Stakeholder Engagement • Baseline Studies including site verification • Compilation of the ESIA Report
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	• Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) Year: 2017 Location: Serenje, Zambia Client: Luwombwa Irrigation Company Main Project Features: Preparation of an Environmental and Social Impact Assessment for the proposed Irrigation Dam Position: Environmental Engineer Activities performed: • Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP) • Submission of TORs, Scoping report, Draft ESIA and final ESIA to ZEMA • Communicating with ZEMA on the progress of the whole ESIA

Expert's contact information: e-mail: twangemalubanachi@gmail.com phone: +260 974 382316/+260 762 241525

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client and/or sanction by ZPPA.



Twange Maluba
Name of Expert

16.06.2022

CURRICULUM VITAE (CV)

Position Title and No.:	Environmental and Social Management
Name of Expert:	Mukonde Chuula
Date of Birth:	15.08.1996
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or Certificate obtained
University of Zambia, Lusaka, Zambia	2018	BSc Environmental Education
St Marceline's Secondary School	2013	Grade 12 Certificate

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2020 - present	Kasumwa Enviroconsult & General Supplies Limited Full Time – Environmental Officer For reference: Robby Kasubika Director, robbykasubika@gmail.com / kasumwa@gmail.com +260979319871	Zambia	- Preparation of Scoping Report, Baseline Studies, - Compilation of the ESIA Report - Preparation of Environmental Management Plan (EMP). - Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA - Communicating with ZEMA on the progress of the whole ESIA - Attending to ZEMA concerns during site inspection
2017-2018	Kalulushi General Hospital- intern- Health Education Promotion For references: Ms Della Banda, Dellabanda@gmail.com , +260 976128408	Zambia	- Community health education and sensitization on selected environmental health issues - Monitoring food safety and hygiene - Clinical waste management produced by the Kalulushi General Hospital

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Very Good	Very Good	Good

Tonga	Good	Good	Good
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Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts	Reference to Prior Work/Assignments that Best Illustrate Capability to Handle the Assigned Tasks
• Prepare EPB's for submission to ZEMA based on detailed design • Prepare EIA's and EMP's where required by ZEMA • Prepare monitoring procedures for checking/confirming EMPs. • Submission of reports to ZEMA as and when required. • Monitor compliance with approved EAI's and EMP's • Monitor the construction work of the contractor for compliance with EPB and ZEMA regulation • Prepare monthly summaries of onsite findings and any deviation or changes to the EMP.	- selected projects -
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2021 <i>Location:</i> Mufulira, Copperbelt Province, Zambia <i>Client:</i> Mulonga water and Sanitation company <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for Rehabilitation and Upgrade of Water and Sewerage Treatment Facilities in Mufulira <i>Position:</i> Consultant - Environmental and Social Management Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2021 <i>Location:</i> Chingola, Copperbelt Province, Zambia <i>Client:</i> Mulonga water and Sanitation company <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for Rehabilitation and Upgrade of Water and Sewerage Treatment Facilities in Chingola District <i>Position:</i> Consultant - Environmental and Social Management Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project

	Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) Year: 2021 Location: Chililabombwe, Copperbelt Province, Zambia Client: Mulonga water and Sanitation company Main Project features: Preparation of an Environmental and Social Impact Assessment for Rehabilitation and Upgrade of Water and Sewerage Treatment Facilities in Chililabombwe Position: Consultant - Environmental and Social Management Expert Activities performed: Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Meeting with ZEMA to discuss TORs and Scoping Report Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) Year: 2021 Location: Kawambwa, Luapula Province, Zambia Client: Workers Compensation Fund Control Board Main Project features: Environmental and Social Impact Assessment for Pine and Eucalyptus Plantation Project in Kawambwa District Position: Consultant Environmental and Social Management Expert Activities performed: Preparation of Scoping Report, Baseline Studies, Compilation of the ESIA Report Preparation of Environmental Management Plan (EMP). Submission of TORs, scoping report, draft ESIA and final ESIA to ZEMA Communicating with ZEMA on the progress of the whole ESIA Attending to ZEMA concerns during site inspection Periodical meetings with ZEMA inspectors on updates and issues concerning the project Worked with ZEMA staff during public hearing for the project Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
	Environmental and Social Impact Assessment (ESIA) Year: 2022 Location: Kabompo, North-Western Province, Zambia

	<i>Client:</i> Lecika Timber Investment Company Limited <i>Main Project features:</i> Preparation of an Environmental and Social Impact Assessment for The Upgrade of a Timber Concession Project in Kabompo District <i>Position:</i> Consultant - Environmental and Social Management Expert <i>Activities performed:</i> Preparation of Scoping Report, Baseline Studies, and Compilation of the ESIA Report, Preparation of Environmental Management and Monitoring Plan (EMMP)
	Name of the Project: Environmental Project Brief for The Establishment of Campsites in Mufulira, Chingola and Chililabombwe Districts, Copperbelt Province, Zambia Year: 2021 Location: Zambia Client: China Henan International Cooperation Group Co., Ltd. Main project features: Preparation of EPBs and associated EMP. Position: Consultant - Environmental and Social Management Expert Activities performed: Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA Name of the Project: Environmental Project Brief for The Establishment of a Campsite in Chingola District, Copperbelt Province, Zambia Year: 2022 Location: Zambia Client: Wah Kong Enterprises Limited Main project features: Preparation of EPBs and associated EMP. Position: Consultant - Environmental and Social Management Expert Activities performed: Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA
	Name of the Project: Environmental Project Brief for timber harvesting and processing projects in ten areas (some of the areas are Mpika, Shiwangandu, Mafinga, Chinsali, Isoka and Chama) Year: 2022 Location: Zambia Client: Various Companies (Ten in total) Main project features: Preparation of EPBs and associated EMPs Position: Consultant - Environmental and Social Management Expert Activities performed: Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. Submission of draft EPBs and final to ZEMA

	Name of the Project: Environmental Project Brief for timber harvesting and processing projects in ten areas (some of the areas are Mpika, Shiwangandu, Mafinga, Chinsali, Isoka and Chama) Year: 2022 Location: Zambia Client: Various Companies (Ten in total) Main project features: Preparation of EPBs and associated EMPs Position: Consultant - Environmental and Social Management Expert Activities performed: - Coordinating the baseline assessment, Compilation of the various EPBs and associated EMPs. - Submission of draft EPBs and final to ZEMA - Meeting with ZEMA to discuss comments on draft EPBs - Communicating with ZEMA on the progress of the whole process - Communicating with ZEMA on behalf of the client on the progress of EPB review - Prepare monthly summaries of onsite findings and any deviation from EMP and submitting to ZEMA
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Expert's contact information:

E-mail: mukondechuula3@gmail.com

Phone: +260 972121373/+260 960764482

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client and/or sanction by ZPPA.



Mukonde Chuula

16.06.2022

Name of Expert

CURRICULUM VITAE (CV)

Position Title and No.:	Ecologist
Name of Expert:	Exilda Kafunda
Date of Birth:	04.02.1998
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or certificate obtained
Copperbelt University, Kitwe, Zambia	2018-2022	Bachelor of Science in Biology (Biodiversity and Ecology)
Katete Girls' Boarding Secondary School	2016	Full Grade 12 certificate

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
2023-present	Kasumwa Enviroconsult and General Supplies Limited – Environmental Officer For references: Robby Kasubika, Director – Technical robbykasubika@gmail.com, +260 979319871	Zambia	• Environmental and Social Impact Assessments • Preparation of Environmental and Social Management Plans (ESMPs) • Development of Legal Compliance Registers • Preparation of Health, Safety and Environmental Management Systems • Compilation of audit reports • Facilitating compliance monitoring and auditing on development projects • Implementation of site and community waste management programs • Preparation of Stakeholder Engagement Plans and operationalisation of these plans • Developing Grievance Redress Mechanisms • Compilation of Environmental and Social Impact Assessment (ESIA) report • Compilation of Strategic Environmental and Social Assessment (SESA) report.

Language Skills:

Language	Speaking/Signing	Reading	Writing
English	Excellent	Excellent	Excellent
Nyanja	Very Good	Very Good	Good
Zambian Sign Language	Very Good		-
Bemba	Good	Good	Good

Adequacy for the Assignment:

Detailed Tasks Assigned on Consultant's Team of Experts	Reference to Prior Work/Assignments that Best Illustrate Capability to Handle the Assigned Tasks
• Prepare EPB's for submission to ZEMA based on detailed design • Prepare EIA's and EMP's where required by ZEMA • Prepare monitoring procedures for checking/confirming EMPs. • Submission of reports to ZEMA as and when required. • Monitor compliance with approved EAI's and EMP's • Preparation of SEA • Monitor the construction work of the contractor for compliance with EPB and ZEMA regulation • Prepare monthly summaries of onsite findings and any deviation or changes to the EMP.	- selected projects -
	Environmental and Social Impact Assessment (ESIA) Year: 2023 Location: Chibombo District, Central Province, Zambia Client: Luminara Farms Limited Main Project features: Preparation of an Environmental and Social Impact Assessment Report for the Proposed Commercial Farming Project Position: Ecologist Activities: • Technical Assessment of Project • Stakeholder Engagement • Baseline Studies including site verification • Compilation of the ESIA Report • Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Environmental and Social Impact Assessment (ESIA) Year: 2023 Location: Mkushi Districts, Central Province, Zambia Client: Chabwino Cropping Limited Main Project Features: Preparation of an Environmental and Social Impact Assessment for the Existing Commercial Farming Project Position: Ecologist Activities: • Technical Assessment of the Project • Stakeholder Engagement • Baseline Studies including site verification • Compilation of the ESIA Report

	Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Environmental and Social Impact Assessment (ESIA) Year: 2023 Location: Mpongwe Districts, Zambia Client: Matalloy Company Limited Main Project Features: Preparation of an Environmental Project Brief for the Proposed Pine and Eucalyptus Plantation Position: Ecologist Activities: - Technical Assessment of the Project - Baseline Studies including site verification - Compilation of the EPB Report
	Environmental and Social Impact Assessments Year: 2024 Location: Mpongwe, Copperbelt Province, Zambia Client: Zataka Investments and Contractors Limited Main Project features: Preparation of an Environmental and Social Impact Assessment for the Existing Commercial Farming Project Position: Ecologist Activities: - Technical Assessment of the Project - Stakeholder Engagement - Baseline Studies - Compilation of the ESIA Report - Preparation of Environmental and Social Management Plan (ESMP) & Environmental and Social Monitoring Plan (ESMoP)
	Strategic Environmental Assessment (SEA) Year: 2024 Location: Western Province, Zambia Client: Legacy Forests Main Project Features: Kafue Zambezi Community Forest Carbon Project (KZCFCP) In Western Province, Zambia. Position: Ecologist Activities: Baseline Studies

	• Compilation of Strategic Environmental Assessment (SEA) Report • Preparation of Environmental and Social Management Plan (ESMP). Environmental and Social Impact Assessment (ESIA) <i>Year :2024</i> <i>Location:</i> Lavushimanda, Mpika and Kanchibiya Districts, Muchinga Province <i>Client:</i> WeForest Zambia <i>Main Project Features:</i> Preparation of Strategic Environmental and Social Assessment Report <i>Position:</i> Ecologist <i>Activities performed:</i> • Technical Assessment of the Project • Baseline Studies including site verification • Compilation of the SESA Report Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) <i>Year: 2025</i> <i>Location:</i> Mkushi District, Zambia <i>Client:</i> Miloso Dam Company Limited <i>Main Project Features:</i> Preparation of an Environmental and Social Impact Assessment for the proposed Dam <i>Position:</i> Ecologist <i>Activities performed:</i> • Baseline Studies, and Compilation of the ESIA Report, • Preparation of Environmental Management and Monitoring Plan (EMMP) • Preparation of Resettlement Action Plan (RAP)
	Environmental and Social Compliance Audit <i>Year: 2025</i> <i>Location:</i> Mkushi District Central Province, Zambia <i>Clients:</i> AJ Moffat Farm Limited, Brimagoba Investment Limited and Kingdom Cropping Farms. <i>Main Project Features:</i> Independent Environmental and Social Compliance Audit Reports <i>Position:</i> Environmental Consultant <i>Activities performed:</i> • Preparation of audit check lists • Physical audit of farms and farms' operations • Compilation of the Audit Reports

	Strategic Environmental and Social Assessment (SESA) Year: 2025 Location: Southern Province, Zambia Client: Legacy Forests Main Project Features: Kafue Zambezi Community Forest Carbon Project (KZCFCP) In Southern Province, Zambia.
	Position: Ecologist Activities: • Baseline Studies • Conducting scoping and Disclosure meetings in various districts • Compilation of Terms of Reference and Scoping Reports • Compilation of Strategic Environmental Assessment (SEA) Report • Preparation of Environmental and Social Management Plan (ESMP). • Submission of draft and final copies of respective documents to ZEMA
	Environmental Project Brief Year: 2025 Location: Chisamba and Kapiri Mposhi District, Central Province Client: Taaz Mining Limited Main Project Features: Environmental Project Brief (EPB) For Large Scale Mineral Exploration Position: Ecologist Activities: • Baseline Studies • Compilation of the EPBs Environmental and Social Impact Assessment (ESIA) Year: 2025 on going Location: Mushindamo District, Northwestern Province Client: Tubombepamo Agric Services Ltd Main Project Features: Environmental and Social Impact Assessment for the Proposed Commercial Farming Project Mushindamo District North-Western Province, Zambia. Position: Ecologist Activities: • Baseline Studies • Conducting scoping and Disclosure meetings • Compilation of Terms of Reference and Scoping Reports • Compilation of Strategic Environmental Assessment (ESIA) Report

	• Submission of draft and final copies of respective documents to ZEMA
	Strategic Environmental and Social Assessment (SESA) – Carbon Forestry <i>Year:</i> 2025 <i>Location:</i> Southern Province <i>Client:</i> Legacy Forests
	<i>Role:</i> Ecologist • Conducted scoping and disclosure meetings. • Prepared ToRs, scoping reports, SESA report, and ESMP. • Supported submission of deliverables to ZEMA.

Expert's contact information: e-mail: xildahmacleans@gmail.com

phone: +260 977 441303/+260 961 242815

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I understand that any misstatement or misrepresentation described herein may lead to my disqualification or dismissal by the Client and/or sanction by ZPPA.



Signature

CURRICULUM VITAE

Personal Information:

Position Title and No.:	Climate Change and Environment Expert
Name of Expert:	Andrew Kabwe
Email	andrewkabwe92@gmail.com
Phone No.	+260 979715458/+260 761516418
Country of Citizenship/ Residence:	Zambia

Education:

Institution	Date	Degree(s) or Diploma obtained
Copperbelt University, Kitwe, Zambia	2024	BSc Sustainable Natural Resources Management and Climate Change
Lubushi Minor Seminary	2018	Full Grade 12 Certificate

Summary of experience:

I hold a Bachelors Degree from the Copperbelt University in Kitwe, Zambia. My speciality is in the preparation of Environmental and Social Safeguards (ESS), ensuring that projects are environmentally sustainable and socially responsible for both people and the planet.

Currently, I am supervising the construction of the Shaibila Dam Project in Mkushi District, Central Province, ensuring the projects compliance to International Safeguard requirements as well as National Environmental and Social standards with respect to the following reference frameworks: International Finance Corporation (IFC) performance standards on Environmental and Social Sustainability, World Bank Environmental and Social Safeguard Policies, Applicable National Environmental and Social regulations and Applicable permits(Licenses, approvals, and consents).

I have recently worked on the Kafue Zambezi Community Forest Project (KZCFP) with Legacy Forest, a mission-driven forest conservation company under the Biocarbon Partners group, who have initiated the KZCFP—a large-scale grouped REDD+ project within the Greater Kafue Zambezi Ecosystem (GKZE). The project targets ecologically sensitive areas within the Kavango Zambezi Transfrontier Conservation Area (KAZA TFCA), anchored by Kafue National Park (KNP), with the goal of conserving key forest catchments of the Zambezi and Kafue Rivers and preserving wildlife corridors between KNP and neighbouring protected areas.

In September 2024, I Participated as a delegate in the SUAD Youth COP, a global simulation of the UNFCCC Conference of the Parties, sponsored by Sorbonne University Abu Dhabi, Université Paris Cité, Universidade Federal do Ceará, and Itau Bank, gaining hands-on experience in Climate negotiations. During this conference, we drafted the Final Declaration documents on the Energy Transition, Biodiversity Conservation, Carbon Credits, Just Transition Fund within the UNFCCC and Technological Transfer.

Employment Record relevant to the assignment:

Period	Employing organization and your title/ position. Contact info for reference	Country	Summary of activities performed relevant to this Assignment
20 25 - pr es en t	Kasumwa Enviroconsult & General Supplies Limited Full Time – Environmental Officer For reference: Robby Kasubika Director, robbykasubika@gmail.com / kasumwa@gmail.com +260979319871	Zambia	• Preparation of Stakeholder Engagement Plans • Facilitating meaningful Community Engagement • Conducting Scoping meetings related to the project • Preparation of Scoping Reports, Terms of Reference (ToRs) and Baseline Studies • Identification of Environmental and Social impacts of a project • Evaluation and Analysis of potential risks and impacts • Designing and Preparation of Health, Safety and Environmental Management plans • Preparation of Environmental and Social Management Plan (ESMP). • Preparation of the Environmental and Social Impact Assessment (ESIA) Report and submission to Zambia Environmental Management Agency (ZEMA) • Facilitating compliance monitoring and auditing on development projects • Conducting Air, Noise and Water quality assessments and monitoring • Developing Grievance Redress Mechanisms

Membership in Professional Associations and Publications:

Institution	Registration/ Publication
	Membership No.
Copperbelt University Natural Resources and Environment Society (CUNRES)	
Copperbelt Institute for Natural Resources and Climate Change (CINRCC)	

Language Skills:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Bemba	Excellent	Excellent	Excellent
Nyanja	Good	Good	Good

Some consultancy work undertaken:

Detailed Tasks Assigned on Consultant's Team of Experts	Reference to Prior Work/Assignments that Best Illustrate Capability to Handle the Assigned Tasks
▫ Prepare EPB's for submission to ZEMA based on detailed design ▫ Prepare ESIA's and ESMP's where required by ZEMA ▫ Prepare monitoring procedures for checking/confirming ESMPs. ▫ Submission of reports to ZEMA as and when required. ▫ Monitor compliance with approved ESIA's and ESMP's ▫ Monitor the construction work of the contractor for compliance with ZEMA regulations ▫ Prepare monthly summaries of onsite findings and any deviation or changes to the ESMP.	- selected projects -
	Environmental and Social Impact Assessment (ESIA) <i>Year:</i> 2025 <i>Location:</i> Mkushi, Central Province, Zambia <i>Client:</i> George Kroussaniotakis <i>Main Project features:</i> Preparation of the Environmental and Social Safeguard Compliance Audit and Monthly Monitoring Reports for the Proposed construction of the Shaibila Dam on the Mkushi River <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Preparation of Environmental and Social Compliance Audit Reports ▫ Preparation of Monthly Environmental and Social Compliance Monitoring Reports ▫ Ensure regulatory requirements are met including the International Finance Corporation's (IFC) guidance on performance standards on Environmental and Social Sustainability, World Bank Environmental and Social Safeguard Policies and National Laws and Regulations ▫ Verify predictions made in the ESIA by obtaining real time measurements, including noise and vibration, water and air quality ▫ Verify that mitigation measures outlined in the ESMP are effective ▫ Provide early warning of potential unplanned for or unmitigated impacts ▫ Strategic community engagement for constructive dialogue ▫ Grievance handling on site ▫ Conduct daily site walk throughs to identify unsafe conditions. Potential hazards and risks ▫ Lead daily and weekly toolbox talks to educate employees on safety procedures and best practices
	Environmental Project Brief (EPB) <i>Year:</i> 2025 <i>Location:</i> Mkushi, Central Province, Zambia <i>Client:</i> Theodoros Karnezos

	<i>Main Project features:</i> Preparation of the EPB for the Proposed Mwansa Chawa Weir (Tembwe River Balance Dam) by Theodoros Karnezos, operating as Martheodina Farm Limited <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Coordinating the baseline assessment ▫ Compilation of the EPB and associated ESMP. ▫ Submission of draft EPBs and final EPB copy to ZEMA
	Strategic Environmental and Social Assessment (SESA) <i>Year:</i> 2025 <i>Location:</i> Southern Province, Zambia (15 Districts) <i>Client:</i> Legacy Forests -Bio Carbon Partners (BCP) <i>Main Project features:</i> Preparation of the SEA for the proposed Kafue Zambezi Community Forest Project (KZCFP) in Southern Province <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Conducted the Scoping meetings ▫ Preparation of the Scoping Report, ToR and Baseline Studies for the SEA study ▫ Compilation of the SEA study report ▫ Preparation of the Environmental and Social Management Plan (ESMP) ▫ Conducted the disclosure meetings ▫ Submission of ToRs, Scoping Report to ZEMA for review
	Strategic Environmental and Social Assessment (SESA) <i>Year:</i> 2025 <i>Location:</i> Luapula Province, Zambia (Chipili and Chifunabuli Districts) <i>Client:</i> World Vision Zambia (WVZ) <i>Main Project features:</i> Preparation of the SEA report for the proposed Community Initiated Regeneration for Carbon and Livelihood Enhancement (CIRCLE) in Luapula Province <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Conducted the Scoping meetings ▫ Conducted Social-Economic surveys

	▫ Preparation of the Scoping Report, ToR and Baseline Studies for the SEA study ▫ Compilation of the SEA study report ▫ Preparation of the Environmental and Social Management Plan (ESMP) ▫ Submission of draft SEA to ZEMA and incorporated ZEMA comments ▫ Conducted the disclosure meetings ▫ Submission of ToRs, Scoping Report, and final SEA report to ZEMA Environmental and Social Safeguard Compliance Audit <i>Year:</i> 2025 <i>Location:</i> Serenje, Central Province, Zambia <i>Client:</i> Three Cousins Agri Limited (TCAL) <i>Main Project features:</i> Preparation of the Environmental and Social Compliance Audit Report for Three Cousins Agri Limited <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed</i> ▫ Document Review including the license from ZEMA and accompanying conditions, internal policies, procedures, and monitoring reports ▫ One-on-one Interviews with Key Personnel ▫ On site inspections ▫ Evaluated the extent to which the regulatory requirements and conditions outlined in the ZEMA decision letter for TCALs are being effectively implemented. ▫ Proposed actionable recommendations for sustained or enhanced adherence to the regulatory requirements and conditions specified in the ESIA approval letter. ▫ Developed a Corrective Action Plan (CAP) based on gaps identified.
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	Ecological Assessment Report <i>Year:</i> 2025 <i>Location:</i> Serenje, Central Province, Zambia <i>Client:</i> Black Star Agricultural Limited (BAL) <i>Main Project features:</i> Rapid Biodiversity Assessment For the 300 Hectares of Land Earmarked for clearing for installation of seven (7) centre pivots within Black Star Agricultural Limited (BAL) Farm <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Identification of Flora and Fauna located within the project footprint ▫ Flora and Fauna analysis using the IUCN Red List to verify the species threat status ▫ Analysis of Critical Habitat to comply with International Performance Standards (PS), particularly those of the International Finance Corporation (IFC), specifically Guidance Note 6 (GN6), which is relevant to biodiversity conservation and sustainable management of living natural resources ▫ Screened the area against the European Union Deforestation Regulation (EUDR) including screening for: a) Significant reduction in tree cover, impacting forest structure b) Decline in native biodiversity, replaced by invasive species or low-diversity secondary growth c) Compromised Ecological Functions ▫ Developed Actionable Recommendations for continued adherence to environmental regulations Environmental Project Brief (EPB) <i>Year:</i> 2025 <i>Location:</i> Mkushi, Central Province, Zambia <i>Client:</i> Black Star Agricultural Limited (BAL) <i>Main Project features:</i> Preparation of the EPB for the Proposed Installation of a Diesel Tank by Blackstar Agriculture Limited <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Coordinating the baseline assessment ▫ Compilation of the EPB and associated ESMP. Submission of draft EPBs and final to ZEMA
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	Environmental Project Brief (EPB) <i>Year:</i> 2025 <i>Location:</i> Mpongwe, Copperbelt Province, Zambia <i>Client:</i> Musyibi Farm Limited <i>Main Project features:</i> Preparation of the EPB for the Proposed Musyibi-Chinwa Airstrip construction on Musyibi Farm, Plot 4436, Chinwa area Mpongwe <i>Position:</i> Consultant - Climate Change and Environment Expert <i>Activities performed:</i> ▫ Coordinating the baseline assessment ▫ Compilation of the EPB and associated ESMP. - Submission of draft EPBs and final to ZEMA
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DECLARATION OF AUTHENTICITY

I, the undersigned, hereby declare that the information provided herein is true, accurate and complete to the best of my knowledge. This CV correctly describes myself, my qualifications, and my experience, and I am available to undertake the assignment in case of an award. I also understand that any wilful misstatement described above may lead to my disqualification, before or during my engagement.



Andrew Kabwe

28.11.2025

Name of Expert



Dr. Darius Phiri – GIS & Remote Sensing Analyst

Copperbelt University,
School of Natural Resources,
Department of Plant and Environmental Sciences
P.O. Box 21692, Kitwe, Zambia.

Contact no.: +260 977785069/ email: dariusphiri@rocketmail.com

Date of	December	Nationality	Zambian
Male			

PERSONAL PROFILE

Darius Phiri is geospatial analyst and a forest scientist with over 10 years consultancy and research experience in natural resource management and he works as a lecture and research at Copperbelt University. Having completed his PhD studies in applied remote sensing in New Zealand, his work focuses on image process, unmanned aerial vehicles (UAVs/Drones), geospatial and statistical modelling using open access tools such R statistical software, Google Engine and QGIS. He has worked on different research projects as a geospatial resources person in charge of data management, image analysis, GIS data collection and GNSS (GPS) navigation.

1. AREA OF EXPERTISE

- Lecturing Forest Management and Planning, Biodiversity Conservation, Remote Sensing and GIS
- Project design, monitoring, and evaluation
- Research and consultancy in Remote Sensing and Geographic Information System

2. EDUCATION QUALIFICATION

- PhD Forestry - University of Canterbury, New Zealand: 2019
- Master of Science in Forestry - University of Stellenbosch, South Africa: 2013
- Bachelor of Science in Forestry – The Copperbelt University, Zambia: 2010
- General school certificate – Chizongwe Technical School, Zambia: 2004

3. WORK EXPERIENCE

Lecture – Copperbelt University, School of Natural Resources – 2013 to 2015: 2020 - **Key Responsibilities**

- Lecturing in Remote Sensing and GIS, Forest Management, Resource Assessment
- Conduct research in Forest Management and Planning, Remote Sensing and GIS
- Preparing Forest Inventory Reports and Management Plans

Teaching Assistant – University of Canterbury, New Zealand, 2018 - 2019

Key Responsibilities

- Teaching introduction to engineering
- Coordinating projects for first-year students

Lecturer – Zambia Forest College, Ministry of Natural Resources - 2010-2011

Key Responsibilities

- Lecturing in Forestry Engineering for Diploma and certificate students
- Coordinate examinations

4. CONSULTANCY

Strategic Environmental and Social Assessment (SESA) for the Community Initiated Regeneration for Carbon and Livelihood Enhancement (CIRCLE) Project in 2 districts of Luapula Province, Zambia. 2025

Key responsibilities: Socioeconomic data analysis, Image analysis including data preprocessing, classification and modelling different scenarios.

Strategic Environmental Assessment (SEA) for the REDD+ Kafue Zambezi Community Forest Project (KZCFP) in 15 districts of Zambia's Southern province (Phase 2). 2025

Key responsibilities: Socioeconomic data analysis, Image analysis including data preprocessing, classification and modelling different scenarios.

Strategic Environmental Assessment (SEA) for the REDD+ Kafue Zambezi Community Forest Project (KZCFP) in 16 districts of Zambia's Western province (Phase 1). 2024

Key responsibilities: Socioeconomic data analysis, Image analysis including data preprocessing, classification and modelling different scenarios.

Development of a Forest Management for Trident Foundation, Lualaba Forest Reserves and Bushingwe Forest Reserves 2023 – ongoing

Key responsibilities: Project activities implementation, monitoring and evaluation

Development of a project document for a national-level project in climate change education FACE-NDC 2023.

Key responsibilities: Project activities design

Ndola International Airport biodiversity assessment and geospatial mapping 2022.

Key responsibilities: Image analysis including data preprocessing, classification and modelling of different scenarios and ecological assessment.

Sentinel agricultural expansion trade-offs project Zambia - 2021/2022

Key responsibilities: Socioeconomic data analysis, Image analysis including data preprocessing, classification and modelling different scenarios.

Biodiversity Assessment for Wood Processing Industry- 2022

Key responsibilities: Remote sensing time series analysis and production of land cover map

Biodiversity Management Plan for KAGEM mine: 2020 - ongoing

Key responsibilities: managing geospatial datasets, developing databases, planning for field data collection by using GPS

Mapping small scale forest using UAVs under Mendelu University: 2021

Key responsibilities: Key resource person training participants in handling UAVs/Drone in natural resource management

Plantation establishment and management plan for Workers Composition: 2021

Key responsibilities: Initial landscape explorations using satellite images and selection of suitable planting sites using geospatial tools

Environment and Socioeconomic Impact Assessment for Chindo Hydro: 2021

Key responsibilities: Socio-economic analysis, managing geospatial datasets, developing databases, planning for field data collection by using GPS and biodiversity report writing

Environment and socioeconomic impact assessment for FRECA mine: 2021

Key responsibilities: managing geospatial datasets, developing databases, planning for field data collection by using GPS and ecological report writing

Traffic impact assessment for Pyramid Continental Hotel in Lusaka: 2020

Key responsibilities: Socio-economic, designing a traffic assessment, analysing datasets, conducting projections and report writing.

National Level land cover assessment for Zambia using Landsat images: 2019 - 2020

Key responsibilities: Image analysis including data preprocessing, classification and modelling different scenarios

Mapping small-scale plantation forest at country level for New Zealand: 2018-2019

Key responsibilities: Geospatial specialist in digitising, maintaining datasets and analysis of country-level dataset for small-scale plantations.

Durable *Eucalyptus* for New Zealand Forest Industry: 2018 – 2019

Key responsibilities: Research assistant in charge of the geospatial laboratory and software maintenance for the project

Forest management plan - edible roots and tubers in Central Province: 2014 - 2015

Key responsibilities: Developing Forest management plans and maintain geospatial database for the project

Forest Management Plan for ZAFFICO on the Copperbelt Province: 2013 - 2015

Key responsibilities: Technical assistance in charge of geospatial laboratory and software maintenance for the project

Annual Forest Management Plan with final year student at CBU: 2013 – on going

Key responsibilities: Technical assistance in charge of geospatial laboratory and software maintenance for the project

5. AWARDS AND ACHIEVEMENT

- Graham Whyte Award 2019 (best performing student) by New Zealand SOF
- PhD Higher Academic Award 2017 by New Zealand Development Aid Scholarship
- Staff development fellowship (SDF) at Copperbelt University
- National Research Funding (NRF) for MSc research on dry land *Eucalyptus* worth
- Best graduating student in BSc Forestry for 2010
- Best Forest Management Plan for BSc Forestry - 2010

6. SKILLS

Project Management, Monitoring and Evaluation (Certificate qualification): Kobo toolbox, ODK, Open Foris, Nvivo

Geospatial software: SPSS, ArcGIS, QGIS, IDRIS, eCognition, ENVI, Agisoft

Programming: R programming, basic Python

Database management: MySQL, ArcCataloge, PostGIS

Writing and statistics: Excellent writing skills and statistical analysis using SPSS, R, and SAS

7. RESEARCH PUBLICATIONS

- Nyirenda V, Phiri D.... et al. (2024) Vulture poisoning in Sub-Saharan Africa and its implications for conservation planning: A systematic review, Helyon.
- Hasimuna, O. J., Chibesa, M., Mumbula, I., Mphande, J., Jere, W. W., Phiri, D., . . . Munganga, B. P. (2023). Contamination of selected heavy metals in *Limnothrissa miodon* (Boulenger, 1906) in the four strata of Lake Kariba Zambia: are the consumers at risk? *Journal of Environmental Science and Health, Part B*, 58(7), 521-529.
- Kourouma, J. M., Monde, C., Phiri, D., & Syampungani, S. (2023). Community-centred approach for assessing social sustainability in mining regions: A case study of Chingola district, Zambia. *Sustainable Development*.
- Mphande, J., Hasimuna, O. J., Kikamba, E., Maulu, S., Nawanzi, K., Phiri, D., . . . Hampuwo, B. M. (2023). Application of anaesthetics in fish hatcheries to promote broodstock and fish seed welfare in Zambia. *Cogent Food & Agriculture*, 9(1), 2211845.
- Mulenga, C., Phiri, D., Ortega-Rodriguez, D. R., & Meincken, M. (2023). Bioaccumulation of potentially toxic elements by indigenous and exotic trees growing around a copper leaching plant in Mufulira, Zambia. *Environmental Systems Research*, 12(1), 26.
- Nyirenda, V. R., Phiri, D., & Chomba, C. (2023). Identifying multiple wildlife species-crop interactions using network analysis. *Journal for Nature Conservation*, 71, 126329.
- Nyirenda, V. R., Phiri, D., & Shakacite, O. (2023). Fostering human-elephant co-existence: a classification tree analysis approach. *Human Dimensions of Wildlife*, 1-16.
- Phiri, D., Mwitwa, J., Ng'andwe, P., Kanja, K., Munyaka, J., Chileshe, F., . . . Kwenye, J. M. (2023). Agricultural expansion into forest reserves in Zambia: a remote sensing approach. *Geocarto International*, 38(1), 2213203.
- Phiri, D., Chanda, C., Nyirenda, V. R., & Lwali, C. A. (2022). An assessment of forest loss and its drivers in protected areas on the Copperbelt province of Zambia: 1972–2016. *Geomatics, Natural Hazards and Risk*.
- Kourouma JM, Eze E, Negash R, Phiri D. et al., (2022) Assessing the spatial-temporal variability of NDVI and VCI as indices of crop productivity in Ethiopia: A remote sensing approach. *Geomatics, Natural Hazards and Risk*.
- Tiamgne VX, Kalaba KF, Nyirenda VR, Phiri D (2022): Modelling areas for sustainable forest management in a mining and human dominated landscape: A Geographical Information System (GIS)- Multi-Criteria Decision Analysis (MCDA) approach, *Annals of GIS*
- Phiri, D.; Simwanda, M.; Nyirenda, V.; Murayama, Y.; Ranagalage, M (2021) Mapping the impacts of cyclone Idai in Mozambique using Sentinel-2 and OBIA approach, *Sothorn Geography Journal*
- Phiri D, Salekin S, Nyirenda R, Simwanda M, Ranagalage M, Murayama Y (2021) Spread of COVID 19 in Zambia: An assessment of environment and socioeconomic factors using CT approach, *Scientific Africa*.
- Simwanda, M.; Murayama, Y.; Phiri, D.; Nyirenda, V.R.; Ranagalage, M.J.R.S. (2021) Simulating Scenarios of Future Intra-Urban Land-Use Expansion Based on the Neural Network–Markov Model: A Case Study of Lusaka, Zambia. 2021, 13, 942.

- Salekin S, Catlin C, Boszniewicz D, Phiri D, Morgenroth J, et al. (2021) Global Tree Taper Modelling: A review of Application, Methods, Functions and their parameters. *Forests*
- Nyirenda, V.R.; Namukonde, N.; Simwanda, M.; Phiri, D.; Murayama, Y.; Ranagalage, M.; Milimo, K.J.D (2020) Rodent Assemblages in the Mosaic of Habitat Types in the Zambebian Bioregion. 2020, 12, 365.
- Phiri, D.; Simwanda, M.; Nyirenda, V.; Murayama, Y.; Ranagalage, M (2020) Decision tree algorithms for developing rulesets for object-based land cover classification. 2020, 9, 329.
- Phiri, D.; Simwanda, M.; Salekin, S.; R Nyirenda, V.; Murayama, Y.; Ranagalage, M.J.R.S (2020) Sentinel-2 Data for Land Cover/Use Mapping: A Review. 2020, 12, 2291.
- Ranagalage, M.; Gunarathna, M.; Surasinghe, T.D.; Dissanayake, D.; Simwanda, M.; Murayama, Y.; Phiri, D.; Nyirenda, V.R. (2020) Spatialtemporal variation of urban heat islands for implementing natural based solution: A case study of Kurunegala, Sri Lanka, *Geo-Information*.
- Ranagalage, M.; Gunarathna, M.; Surasinghe, T.D.; Dissanayake, D.; Simwanda, M.; Murayama, Y.; Morimoto, T.; Phiri, D.; Nyirenda, V.R.; Premakantha, K.J.F (2020) Multi-Decadal Forest-Cover Dynamics in the Tropical Realm: Past Trends and Policy Insights for Forest Conservation in Dry Zone of Sri Lanka. 2020, 11, 836.
- Phiri, D., Morgenroth, J., & Xu, C. (2019). Long-term land cover change in Zambia: An assessment of driving factors. *Science of The Total Environment*, 134206. doi:<https://doi.org/10.1016/j.scitotenv.2019.134206>
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REFEREES

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Dr. Darius Phiri :



CURRICULUM VITAE			
1. Name	Bowas Katamvu - Wildlife Expert	Nationality: Zambian	Marital status: Married
2. Contact Details	E-mail(s): bowasthethird@gmail.com Mobile Numbers: +260 964140956/+260 974140956 Home address: House No. 2780, Kwacha East, Kitwe		
3. Professional Summary	Environmental and Wildlife Management professional holding a Bachelor of Science in Wildlife Management and a Certificate in Monitoring and Evaluation. Experienced as an Environmental Officer, with hands-on involvement in environmental assessment processes including the preparation of Terms of Reference (ToRs), Scoping Reports, Environmental Project Briefs (EPBs), Environmental and Social Management Plans (ESMPs), Strategic Environmental Assessments (SEAs), and Environmental Impact Assessments (EIAs). Demonstrated competence in environmental data collection, analysis, and technical report writing, as well as effective community engagement and stakeholder consultation. Completed an internship with the Forestry Department, gaining practical exposure in environmental monitoring, sustainable forest management, EIA/ESIA support activities, field data collection, research, and reporting. Possesses working knowledge of monitoring and evaluation principles, survey techniques and sampling methods, and the use of GPS devices for environmental and forestry applications. Adept at supporting evidence-based decision-making in environmental management and natural resource conservation projects.		
4. Education	• BSc Wildlife Management, Copperbelt University, 2011-2014 • Certificate Monitoring and Evaluation, University of Zambia, 2025. • Certificate First Aid, Zambia Red Cross Society, 2025.		
5. Key Selected Experience:			
Environmental Project Brief (EPB) Year: 2025 Location: Mkushi, Central Province, Zambia Client: Theodoros Karnezos Main Project features: Preparation of the EPB for the Proposed Mwansa Chawa Weir (Tembwe River Balance Dam) by Theodoros Karnezos, operating as Martheodina Farm Limited Position: Wildlife Expert			

Activities performed:

- Compilation of the EPB and associated ESMP.
- Submission of draft EPBs and final EPB copy to ZEMA

Strategic Environmental and Social Assessment (SESA)

Year: 2025

Location: Southern Province, Zambia (15 Districts)

Client: Legacy Forests -Bio Carbon Partners (BCP)

Main Project features: Preparation of the SEA for the proposed Kafue Zambezi Community Forest Project (KZCFP) in Southern Province

Position: **Wildlife Expert**

Activities performed:

- Preparation of the Scoping Report, ToR and Baseline Studies for the SEA study
- Compilation of the SEA study report
- Preparation of the Environmental and Social Management Plan (ESMP)
- Conducted the disclosure meetings
- Submission of ToRs, Scoping Report to ZEMA for review

Strategic Environmental Assessment

Year: 2025

Location: Luapula Province, Zambia (Chipili and Chifunabuli Districts)

Client: World Vision Zambia (WVZL)

Main Project features: Preparation of the ToRs and Scoping report for the proposed Community Initiated Regeneration for Carbon and Livelihood Enhancement (CIRCLE) in Luapula Province

Position: **Wildlife Expert**

Activities performed:

- Conducted the Scoping meetings
- Conducted Social-Economic surveys
- Preparation of the Scoping Report, ToR and Baseline Studies for the SEA study
 - Conducted the disclosure meetings
 - Working on ZEMA ToRs and Scoping Report comments

Ecological Assessment Report

Year: 2025

Location: Mpongwe, Copperbelt Province, Zambia

Client: Musyibi Farm Limited

Main Project features: Biodiversity Assessment For the Land Earmarked for clearing for construction of Musyibi Chinwa Airstrip by Musyibi Farm Limited

Position: **Wildlife Expert**

Activities performed:

- Identification of Flora and Fauna located within the project footprint
- Flora and Fauna analysis using the IUCN Red List to verify the species threat status
- Analysis of Critical Habitat to comply with International Performance Standards (PS), particularly those of the International Finance Corporation (IFC), specifically Guidance Note 6 (GN6), which is relevant to biodiversity conservation and sustainable management of living natural resources
- Screened the area against the European Union Deforestation Regulation (EUDR) including screening for:
 - a) Significant reduction in tree cover, impacting forest structure
 - b) Decline in native biodiversity, replaced by invasive species or low-diversity secondary growth
 - c) Compromised Ecological Functions
- Developed Actionable Recommendations for continued adherence to environmental regulations

Environmental Project Brief (EPB)

Year: 2025

Location: Mkushi, Central Province, Zambia

Client: Black Star Agricultural Limited (BAL)

Main Project features: Preparation of the EPB for the Proposed Installation of a Diesel Tank by Blackstar Agriculture Limited

Position: **Wildlife Expert**

Activities performed:

- Compilation of the EPB
- Submission of draft EPBs and final to ZEMA

Environmental Project Brief (EPB)

Year: 2025

Location: Mpongwe, Copperbelt Province, Zambia

Client: Musyibi Farm Limited

Main Project features: Preparation of the EPB for the Proposed Musyibi-Chinwa Airstrip construction on Musyibi Farm, Plot 4436, Chinwa area Mpongwe

Position: **Wildlife Expert**

Activities performed:

- Compilation of the EPB and associated ESMP.
- Submission of draft EPBs and final to ZEMA

School Operations

Year: 2022 – 2024

Location: Kitwe, Copperbelt Province, Zambia

Employer: **Clahina Private School, Kitwe**

Position: **Manager**

Activities performed:

- Planned, coordinated, and managed institutional operations, including budgeting, scheduling, and resource allocation, skills directly applicable to environmental programme implementation.
- Supervised academic and co-curricular programmes, demonstrating experience in oversight, monitoring, and performance evaluation of activities in line with set standards.
- Provided leadership, mentorship, and capacity-building support to staff and learners, comparable to environmental awareness and training roles.
- Engaged parents, staff, and the surrounding community, strengthening stakeholder engagement, consultation, and communication skills relevant to environmental and social safeguard processes.
- Ensured compliance with internal policies and external regulatory requirements, supporting institutional governance and reporting functions.

USAID SUN TA Project

Year: 2021 – 2022

Location: Kitwe, Copperbelt Province, Zambia

Employer: **TechnoServe Zambia**

Position: **Field Monitoring Officer**

Activities performed:

- Conducted field-based data collection and verification, supporting environmental and social monitoring activities in project areas.
- Verified project beneficiaries and site-level information, strengthening compliance, accountability, and data integrity for reporting purposes.
- Ensured accuracy, consistency, and completeness of monitoring data, contributing to evidence-based decision-making and regulatory reporting.
- Supported monitoring and evaluation (M&E) of project outcomes, including performance tracking against established indicators.
- Assisted in the preparation of technical and progress reports, drawing on analyzed field data.

Supervision of Undergraduate Science Research and Laboratory Projects

Year: 2018

Location: Kitwe, Copperbelt Province, Zambia

Employer: **Oakland College of Education**

Position: **Teaching Assistant**

Activities performed:

- Delivered science-based instruction and facilitated practical laboratory sessions, strengthening analytical and technical skills relevant to environmental studies.
- Guided students in research design, data collection, and project implementation, aligning with environmental research and field assessment processes.
- Assessed, evaluated, and documented academic performance, demonstrating experience in data analysis, reporting, and quality control.

- Supported academic staff in curriculum delivery and learner mentorship, contributing to capacity building and knowledge transfer.

Forestry Department, Forest Research Branch, Kitwe

Year: 2015 - 2018

Location: Kitwe, Copperbelt Province, Zambia

Position: **Intern**

Activities performed:

- Supported forest research and ecological studies, including tree growth assessments and seed germination trials.
- Conducted entomological work within the Insectarium Section, including identification and classification of insects and assessment of their effects on forest and agricultural plants.
- Assisted in the development and maintenance of an insect database, supporting pest monitoring, biodiversity records, and research analysis.
- Coordinated and supervised field data collection activities, including oversight of university students during research fieldwork.
- Planned, implemented, and monitored field-based research activities, ensuring adherence to research protocols and data quality standards.
- Collected, analysed, and interpreted forestry and ecological data to inform technical research outputs.
- Prepared, reviewed, and presented technical research and monitoring reports, contributing to evidence-based forest and environmental management.

Declaration:

I, the undersigned, certify that to the best of my knowledge, this Curriculum Vitae correctly describes myself, my experience, and my qualifications.

Name: Bowas Katamvu

Signature



Date Signed: **10.01.2026**