



JCM Matswani Solar Corp Limited

*Environmental and Social Impact Assessment for the
proposed 60 MW Solar Power Plant in Kanzimbe
Village, TA Kalonga, Salima District, Central Region,
Malawi*

Final Report

September 2018

Environmental and Social Impact Assessment (ESIA)

60 MW Solar Power Plant in Kanzimbe Village, TA Kalonga, Salima District,
Central Region, Malawi

JCM Matswani Solar Corp Limited

Final Report

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EXECUTIVE SUMMARY

Introduction

This is the Environmental and Social Impact Assessment (ESIA) report for the construction and operation of a 60 megawatt (MW) ⁽¹⁾ alternating current solar photovoltaic (PV) plant and 4 km transmission line ('the Project') on a 168 hectare (ha) land plot in Salima District situated in the Central Region of Malawi. In addition, the transmission line wayleave will impact approximately 57 ha of land. Impacts from the land acquisition, and construction and operation of the Project (including wayleave) are included in this ESIA. In total, 72 people were affected by the land acquisition for Phase I and 166 for Phase II, with the majority of affected land plots comprising under one ha.

The Project is being undertaken by JCM Matswani Solar Corp Limited (a limited liability corporation in Malawi owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited, and Matswani Capital (PTY) Limited) (herein referred to as 'ProjectCo'). The Project will take approximately 12 months to construct and construction is expected to start at the end of 2018. The Project has an investment value of USD \$80,000,000 and will be operational for a minimum of 20 years. The Project has agreed a Power Purchase Agreement (PPA) with ESCOM and the power from the Project will be fed directly into the national grid via a 4 km 132 kilovolt (kV) transmission line through to the Nanjoka substation.

The ESIA Process

A Project Brief was submitted to the Malawian Environmental Affairs Department (EAD) in late 2017 and received a response on the 6th of January 2018. Following a review of the Project Brief, which was prepared in line with the Environment Management Act 1996 (EMA), it was confirmed by the EAD that the Project required a detailed Environmental Impact Assessment (EIA). As the ProjectCo intends to seek international finance for the Project, the ESIA has also been developed in line with the International Finance Corporation (IFC) Performance Standards (PS) as well as the Malawian EMA.

Project Justification

This Project is an investment in renewable energy and will help with the diversification of the energy sector as well as add to increased capacity for the national grid. In addition, the Project is part of the government IPP process and is part of sector reform development.

(1) The capacity of the project may increase to 60 MW at request of the Government of Malawi at any time. However, it is important to note that no new land take will be required as result of this change.

The Project

The Project comprises of a 60 MW solar PV plant on a 168 ha green field site in Kalonga Traditional Authority (TA), Salima District. It is adjacent to the villages of Kanzimbe and Mayambo, under Kanzimbe Group Village (KGV), 20 km from the town of Salima and 88 km from Lilongwe (along on the M5 and M14 roads).

The solar plant will connect to a 4 km 132 kV transmission line that runs alongside an existing Electricity Supply Corporation of Malawi (ESCOM) 132 kV transmission line to the Nanjoka substation. Electricity generated will be sold to ESCOM and will be transferred to the national grid via the existing ESCOM Nanjoka substation.

The PV solar technology chosen for this Project consists of the following main components:

- **PV cell:** The PV cell is the device that generates electricity when exposed to solar radiation.
- **PV module:** The PV module is the set of interconnected photovoltaic cells encapsulated between a transparent front (usually glass) and a backing support material then mounted in an aluminium frame
- **Mounting structures:** Multiple PV modules are bolted onto a mounting structure which tracks the sun's progress across the sky in an east to west direction.
- **PV array:** The PV array is the complete power generating plant consisting of multiple PV modules wired in series and in parallel.
- **Inverter:** The inverter converts the Direct Current (DC) to Alternative Current (AC)
- **Substation:** The substation receives all power from the inverters via underground cables and provides protection and control equipment required to safely manage the plant and to ensure grid code compliance regulations.
- **Transformer:** The transformer steps up the AC power from the inverters (typically at 33 kV) to match the grid voltage (expected to be 132 kV).
- **Stores, offices and control building.**
- **Access tracks and fencing.**
- **5 km 132 kV transmission line.**

Project Phases

The Project will be completed in three phases:

- site preparation and construction;
- operational; and
- decommissioning.

Site preparation and construction will involve the clearance of vegetation, installation of fencing and levelling of the site and preliminary earthworks. The site will be marked out, safety and security fencing installed, the access road will be upgraded, and internal site access tracks will be constructed. It is anticipated that there will be approximately 200 workers on the Project site across the six-nine month construction phase.

The solar PV power plant will be operated on a 24 hour, 7 days a week basis with 20 on site workers. Key operational activities will include:

- cleaning of the modules
- vegetation management for under and around the modules
- maintenance of all Project Components
- site security monitoring.

The proposed Project is expected to operate for at least 20 years. It is important to note that the ProjectCo and ESCOM may agree to trigger a clause in the PPA which would simply extend the term beyond 20 years. Therefore, it is possible the plant will operate beyond a 20 year life span. Furthermore, the land leases for the Project are for 50 years.

Project Baseline

The sensitivity of the site was assessed and the habitats in the near vicinity of the Project show considerable evidence of transformation, with the overall floral and faunal species composition showing a divergent change from the natural state. The vegetation is dominated by plant species that provide benefits to local communities, with many non-beneficial species having been eliminated through settlement and cultivation practices. As a result there are many species of non-native origin present. Human activity has substantially modified an area's primary ecological functions and species composition, and the habitats there conform to modified habitats as described in Performance Standard (PS) 6.

The Project is not located within the vicinity of protected areas, no highly threatened or range restricted floral or faunal species are considered likely to be present, and no large congregations of species are expected to occur. What remains of the habitats are representative of a widespread vegetation formation, and are therefore not unique. Based on these observations, no critical habitats are expected to occur, and a critical habitat assessment following IFC PS6 is therefore not necessary.

The ecological sensitivity of the Project area is therefore considered to be low. PS6 does not stipulate minimum requirements for developments within modified habitats, but states measures should be taken to minimise impacts on remaining biodiversity and implement mitigation as appropriate.

The Project Site is situated in the central region of Malawi, approximately 30 km Salima District Centre, and within Kalonga TA and the Kanzimbe GVH. All the villages in the Project area rely on subsistence farming for their household food consumption, with some households generating a small income from crops. Additionally, livestock rearing, particularly of goats and poultry is common. Livestock use the Project area for grazing.

Farmers generally have land plots that are under one ha. In combination with small land plots and a lack of irrigation, communities suffer food shortages during the dry seasons, especially December to February. Malaria is the most prevent illness experienced by men, women and children in the Project area due to poor sanitary conditions in villages. It is particularly prevalent during the rainy season as pools of rain water accumulate in low lying areas. Gastric illnesses such as diarrhoea, colds and other illnesses can spread if proper sanitation and hygiene is not effectively managed. Sexually transmitted diseases are also prevalent in the District.

Stakeholder Engagement

Extensive stakeholder engagement has been undertaken as part of the ESIA, the land acquisition activities, and the corporate social responsibility feasibility study. Through these actions all relevant stakeholders have been engaged and their feedback gathered. *Chapter 7* describes the stakeholder engagement undertaken to date.

Impact Assessment

The ESIA identified both potential positive and adverse impacts, as illustrated in the *Table 1*. The table summarises the potential impacts of the Project phases (construction and operation) before and after mitigation measures. Mitigation measures that are included in this Report become set project commitments, which will be implemented by ProjectCo as part of the Environmental and Social Management Plan (ESMP).

Table 1

Summary of Impact Assessment Findings

Potential Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Generation of electricity	Operation	Positive	Positive
Employment and economy	Construction and Operation	Positive	Positive
Nuisance and impact to air quality from dust emissions	Construction	Moderate	Minor
Nuisance from construction noise	Construction	Moderate	Minor
Soil erosion and reduced soil quality	Construction	Moderate	Minor
Reduction in groundwater quality and availability	Construction	Moderate	Minor
Biodiversity- loss of habitat and faunal disturbance	Construction	Minor	Negligible
Biodiversity- loss of threatened flora	Construction	Moderate	Minor
Biodiversity- risk of increased invasive alien plants	Construction	Minor	Negligible
Biodiversity-disruption of ecosystem services	Construction	Moderate	Minor
Change in landscape and visual amenity	Construction	Moderate	Minor
Change in landscape and visual amenity from solar reflection	Operation	Moderate	Minor
Physical and economic displacement from project land take	Construction	Major	Minor
Access restrictions from project land take	Construction and Operations	Moderate	Minor
Increased risk of vector borne or communicable diseases	Construction	Minor	Negligible
Increase risk in STI/HIV transmission	Construction	Minor	Negligible
Increase risk to community safety and security	Construction	Moderate	Minor
Increase risk to community safety and security	Operation	Minor	Negligible

Positive Impacts

As noted in *Chapter 8*, positive impacts are associated with economy and livelihoods, through the creation of approximately 200 jobs during construction and 20 during operation. There will be on the job training and capacity development opportunities. Enhancement measures have been proposed to maximise the potential positive benefits.

The generation of 60 MW of power will lead to an 11% increase in the generation capacity of Malawi, representing a significant benefit to the macro economy of the country.

Finally, as part of the Project the ProjectCo will invest in a Corporate Social Responsibility (CSR) programme which will ensure the Project affected communities directly benefit from the Project.

Potential Adverse Impacts

Due to the nature of a solar plant, its construction and operation, the majority of the potential environmental and social impacts occur during the construction phase. As described in the table above there were several potential impacts from routine Project activities of *major* or *moderate* significance. All of these potential impacts have been addressed through mitigation and management measures (as included in *Table 10.1 and 10.2*) of the ESIA report, and the potential impacts have been reduced to *minor* or *negligible* significance.

There is always the potential for unplanned events such as spills and traffic accidents. These have been identified (see *Section 9.13*) and preventative measures will be put in place to reduce the likelihood of these occurring.

Resettlement Activities

The land acquisition for the Project has been undertaken in two phases. Phase I refers to an initial 80 ha plot of land and Phase II refers to additional 88 ha plot of land. The land acquisition process for Phase I was Government-led process, led by the Salima District Office and undertaken at the end of 2017, prior to the development of the ESIA. The Phase II land acquisition is still underway at the time of completing this ESIA.

Land acquisition will trigger economic displacement of land users, primarily comprising subsistence farmers. Due to food shortages in communities resulting from inefficient farming techniques, the impact of land acquisition and economic displacement is likely to exacerbate food insecurity and heighten poverty levels. The high levels of subsistence farming within the communities in the Project area produces low income levels and high levels of poverty.

72 people were compensated by Phase I of land acquisition: 50 people in Kanzimbe Village (24 males and 26 females) and 22 people in Mayambo Village (8 males and 14 females). In terms of Phase II, a total of 166 people are impacted (77 males and 89 females).

In order to mitigate the impacts of economic displacement, a Livelihood Restoration Plan (LRP) is in the process of being developed that sets out the extent and scale of displacement impacts, engagement activities related to land acquisition, eligibility and entitlements for affected persons and the implementation, monitoring and evaluation requirements.

Development and Implementation of ESMP

An ESMP has been developed to specify the standards and controls required to manage and monitor the environmental and social impacts. To achieve this, the ESMP Framework identifies potential adverse impacts from the planned activities and outlines mitigation measures required to reduce the likely negative impacts on the biophysical and social environment. The ESMP actions, contained in this report are legally binding on authorisation of the ESIA and ESMP by the EAD.

The key mitigation and enhancement measures are summarised as below *Table 3* and *Table 4* (full mitigation and enhancement measures included in *Section 10*).

In summary, the proposed Project will benefit the local economy through job creation and upskilling of the local workforce as well as generation of additional electricity for the country. Whilst adverse impacts have been identified, there are no potential impacts, which cannot be managed and outweigh the positive impacts of the Project and the objective of the Project in developing additional power generation for Malawi. This Project is in line with the Malawian Government's drive to produce renewable energy in the country. Finally, those adverse impacts that have been identified in the ESIA have been minimised through the implementation of the ESMP, which is based on the approach of continual improvement following international best practice.

Likewise, positive impacts have been enhanced and maximised through the ESMP by the ProjectCo's commitment to ongoing engagement with the community and key stakeholders and an open and transparent dialogue and hiring process throughout the life cycle of the Project. On the basis of this ESIA Report it is recommended that the Project continue as planned.

Table 2 *Summary of Enhancement Measures*

Impact	Project Phase	Summary of Enhancement Measure
Employment and the Economy • Employment opportunities and the need for the supply of goods and services has the potential to create jobs for the local community and improve income levels.	Construction and Operation	<ul style="list-style-type: none"> • Provide opportunities to local communities to enhance income levels, skills/employability and improve the quality of life • Ongoing costs for recruitment activities are included in the EPC contractor’s bid. • ProjectCo to verify that the procedure has been implemented.
Generation of Electricity	Operation	<ul style="list-style-type: none"> • As electricity generation is ambit of ESCOM there are no applicable enhancement measures
Corporate Social Responsibility	Construction and Operation	<ul style="list-style-type: none"> • The CSR Plan has already been developed and will be implemented across the Project Lifecycle

Table 3 Summary of Mitigation Measures

Impact	Project Phase	Summary of Mitigation Measures
Reduction in air quality from fugitive dust emissions	Construction	<ul style="list-style-type: none"> • Restrict the removal of vegetation and soil cover; • Land clearance will be sequential and the smallest possible area for working will be exposed; • Stripping of topsoil will not be conducted earlier than required in order to prevent the erosion; • Speed limits will be enforced; • All transported materials must be covered with tarpaulins to prevent fugitive dust; • Where feasible, surface binding agents will be used on exposed open earthworks; • Exposed ground and earthworks should be covered as much as possible; • Stockpiles stored longer than six weeks should be vegetated or covered to reduce soil loss from wind or storm water runoff; • Stockpiles will be located as far away from receptors as possible and will be covered (with sheeting, shade cloth or tarpaulin); • Wind breaks will be erected around the key construction activities • All construction vehicles must be regularly maintained to minimise exhaust emissions; • When not in use, vehicles will be switched off, unless impractical for health and safety reasons; • Any complaints received from neighbours must be reported to the ProjectCo
Nuisance from construction noise emissions	Construction	<ul style="list-style-type: none"> • Maintain machines and plant equipment in good working condition and inspect regularly; • Selection of equipment and vehicles in accordance with best available techniques for noise reduction; • Minimise vehicle movements within and around the site as much as possible; • Use local screening/site hoardings to screen noise where appropriate; and • Complaints received from neighbours must be reported to ProjectCo
Soil erosion and reduced soil quality	Construction	<ul style="list-style-type: none"> • Mitigation measures for air emissions are applicable to this impact • Erosion control measures will be constructed where necessary. • Access roads will be well drained in order to limit soil erosion.
Reduction in groundwater quality and availability	Construction	<ul style="list-style-type: none"> • Monitoring water levels within existing wells and boreholes will be undertaken during installation drilling and pump testing of project abstraction boreholes. • Radius of influence will be recalculated using site-specific hydrogeological parameters. Project abstractions will be located outside the radius of influence if practical. • Further assessment will be done at a later stage with updated information from all community boreholes; • Continuous monitoring of affected village supplies and a cessation of project abstraction if the groundwater elevation in village water supply wells reaches a pre-agreed level. • Water storage solutions (eg tanks) for water pumped during the wet season for use during the dry season.
Reduction in groundwater quality and availability	Operation	<ul style="list-style-type: none"> • Continuous monitoring of affected village supplies and a cessation of project abstraction if the groundwater elevation in village water supply wells reaches a pre-agreed level. • Water storage solutions (eg tanks) for water pumped during the wet season for use during the dry season.

Biodiversity- loss of habitat and faunal disturbance	Construction	<ul style="list-style-type: none"> • Ensure that vegetation is methodically cleared to avoid unwarranted clearance of vegetation. • Provisions that prohibit staff and contractors from engaging in all forms of hunting in the Project area • Rehabilitation of all disturbed areas must be undertaken following construction.
Biodiversity- loss of threatened flora	Construction	<ul style="list-style-type: none"> • Rehabilitation of all disturbed areas must be undertaken following construction. • Ensure that vegetation is methodically cleared to avoid unwarranted clearance of vegetation. • Provisions that prohibit workers and contractors from clearing/ utilising word and plant species in the Project Area
Biodiversity- risk of increased invasive alien plants	Construction	<ul style="list-style-type: none"> • Invasive alien plants will be removed from areas controlled by EPC Contractor. • All alien vegetative and/or seed bearing material that is removed through control measures should be contained in a cordoned off area, dried and burnt on site to prevent the distribution of seeds. • Vehicles and construction equipment should be washed on a regular basis • Source areas such as vehicle parking, construction camps should be kept clean of invasive plants to minimise the presence of seeds that can be dispersed unintentionally. • Disturbed areas will be rehabilitated at the earliest opportunity to minimise the establishment of invasive alien plants. • Regular and ongoing monitoring of the presence of invasive alien plants should be conducted within construction and rehabilitated sites.
Biodiversity-disruption of ecosystem services	Construction	<ul style="list-style-type: none"> • Rehabilitation of all disturbed areas must be undertaken following construction. • Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such has wood fuel, mangoes, building materials or other useable resources. • Piles of woody vegetation cleared for construction activities are to be made available to communities to access it for use as wood fuel or other purposes.
Change in landscape and visual amenity	Construction	<ul style="list-style-type: none"> • Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum • Any excavated or cut and fill areas will be landscaped and allowed to revegetate; • No debris or waste materials will be left at the work sites; and • Appropriate directional and intensity settings will be utilised on all lighting.
Change in landscape and visual amenity from solar reflection	Operations	<ul style="list-style-type: none"> • Rehabilitation of all disturbed areas must be undertaken following construction. • Maintain ongoing engagement between the Project and local communities with regards to potential solar reflection impacts.
Unplanned Events: <ul style="list-style-type: none"> • Spill events/improper disposal of waste leading to soil and groundwater contamination 	Construction	<ul style="list-style-type: none"> • The Project will develop a Hazardous Spill Response Plan (HSRP) and maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. • The Project will develop and implement a Waste Management Plan. • Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, or removed by a local contractor. • Hazardous material storage will be on hard standing and impermeable surface and the storage facility will be bunded.

<p>Unplanned Events:</p> <ul style="list-style-type: none"> Spill events/improper disposal of waste leading to soil and groundwater contamination 	Operations	<ul style="list-style-type: none"> The Project will implement a Hazardous Spill Response Plan (HSRP) and maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated. The Project will implement and Waste Management Plan. Hazardous material storage will be on hard standing and impermeable surface and the storage facility will be banded.
<p>Unplanned Events:</p> <ul style="list-style-type: none"> Traffic Accidents 	Construction	<ul style="list-style-type: none"> A Traffic Management Plan, driving codes of conduct and enhanced driver safety awareness will be implemented Plan traffic routes to limit road use by the Project during high traffic periods and in sensitive areas such as near schools Assess local road conditions and discuss road maintenance during Project construction to minimise traffic risks associated with roads deteriorated from Project activities. The Project will provide driver training to promote safe and responsible driving behaviour. Engage with local communities and authorities to inform them about plans and procedures Implement awareness campaigns recording traffic and road safety in communities along the transport corridor. Work with the relevant local and regional government to ensure the roads used by Project vehicles are well maintained, and that potential problems or hazards are communicated to the relevant authority timeously.
<p>Land acquisition and displacement</p> <ul style="list-style-type: none"> Land clearance, causing economic displacement, in particular of subsistence farmers and land for livestock grazing. Displacement of one structure used for a goat farmer in the wayleave. The structure is not used for residential purposes. 	Construction	<ul style="list-style-type: none"> Develop a Livelihood Restoration Plan (LRP) Ensure an inclusive and participatory consultation process that ensures the participation of women, men, youth, elderly, disabled and other groups in the decision making process in relation to replacement land and livelihood restoration programmes.
<p>Access restrictions</p> <ul style="list-style-type: none"> The presence of construction equipment and activities during this period may block pathways that transect the solar site, including access to communities and farmland 	Construction	<ul style="list-style-type: none"> Undertake consultation with communities using farmland in areas affected during construction to establish the best alternative routes.
<p>Access restrictions</p> <ul style="list-style-type: none"> The presence of construction equipment and activities during this period may block pathways that transect the solar site, 	Operations	<ul style="list-style-type: none"> Undertake consultation with communities using farmland in areas affected during operation to establish the best alternative routes and measures that the Project should put in place to minimize impacts related to access restrictions.

including access to communities and farmland		
<p>Vector borne and communicable diseases</p> <ul style="list-style-type: none"> Construction equipment and activities have the potential to create dust emissions and create breeding grounds for vector borne illnesses affecting communities living in villages adjacent to the solar site. Additionally the presence of the workforce during this period in combination with poor sanitary conditions has the potential to increase communicable diseases 	Construction	<ul style="list-style-type: none"> Provide workforce training on communicable diseases, disease prevention and treatment to raise awareness. Establish a worker Code of Conduct that includes guidelines on worker-worker interactions and worker-community interactions Provide workers with appropriate gender friendly sanitary facilities Develop a robust waste handling system to avoid the creation of new vector breeding grounds. Establish measures to reduce the presence of standing water onsite during site preparation Ensure that working areas are kept clean and free from any accumulation of wastes as well as supplied with clean potable water. Have a first aid point on site to avoid adding pressure on local health facilities. In line with best practice requirements regarding the health of the workforce, develop and implement pre-employment screening measures to ensure that workers are fit for work, as well as identify any pre-existing conditions. However, no one should be denied employment on the basis of their health status as long as they are able to undertake the required duties (following treatment if relevant).
<ul style="list-style-type: none"> Increase risk in STI/HIV transmission 	Construction	<ul style="list-style-type: none"> Develop and implement an STI/HIV Management Plan and support a women's NGO that is addressing gender and GBV issues in Salima and in Project affected communities, to raise awareness of such issues and to encourage prevention.
<p>Community safety and security</p> <ul style="list-style-type: none"> Security risk in relation to petty crime, increased GBV and perceptions that people in the communities are benefitting more than others creating tensions. Worker-community interactions, including the presence of security may pose a threat to the community. 	Construction and operation	<ul style="list-style-type: none"> Project will train security personnel in safeguarding of the community in high tension situations Project security will comply with Malawian laws and regulations as well as the requirements of the Voluntary Principles for Security and Human Rights. Project will provide security measures for the construction site to minimise safety risks and the possibility of theft. Project will establish clear and visible signage in construction areas to warn the community of any risks and hazards. Project will establish a community engagement programme to provide information about safety hazards and raise awareness of how these are being managed. Project will raise awareness to communities regarding their Grievance Mechanism to deal with community concerns and issues in a timely manner to avoid issues escalating.
<p>Labour and working conditions</p> <ul style="list-style-type: none"> During peak construction the workforce may be subject to poor labour and working conditions 	Construction and operation	<ul style="list-style-type: none"> Develop a Human Resources Policy, which includes a Labour and Employment Plan and Worker Grievance Mechanism. Prepare a Gender Development Plan to promote gender equality in relation to job opportunities Ensure that contracts will make explicit reference to the need to abide by Malawian law and international standards. Ensure that as part of any contractor and supplier selection process, performance with regard to worker management, worker rights, health and safety as outlined in Malawian law and international standards will be managed and reported on. Support contractors in adhering to labour and working conditions that are in line with Malawian legislation and IFC PS 2 Undertake regular checks of contractors to ensure the relevant labour laws are adhered to at all times.

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- Implement a health and safety programme will be developed that includes risk assessments work permit systems and a H&S management system, in line with industry best practice.
 - Establish a hiring mechanism to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.
 - Ensure that all workers will, as part of their induction, receive training on worker rights in line with Malawian legislation and international standards.
 - Ensure that all workers will have contracts which clearly state the terms and conditions of their employment and their legal rights.
 - Ensure that a fair and transparent worker Grievance Mechanism is in place that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed.
 - Ensure that all workers will have access to training on communicable diseases, STI's and community interactions in general.
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ABBREVIATIONS

Abbreviation	Definition
AC	Alternate Current
ADC	Area Development Committee
AoI	Area of Influence
ARI	Acute Respiratory Infection
CSR	Corporate Social Responsibility
DAoI	Direct Area of Influence
DC	District Commissioner
DC	Direct Current
DCC	District Consultative Committee
DEC	District Executive Council
DLO	District Lands Officer
EAD	Environmental Affairs Department
EHS	Environmental Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EP	Equator Principles
EPC	Engineering, Procurement, Construction contractor
ERM	Environmental Resources Management
ES	Environmental and Social
ESCOM	Electricity Supply Corporation of Malawi
ESIA	Environmental and Social Impact Assessment
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESMP	Environmental and Social Management Plan
GVH	Group Village Headman
Ha	Hectares
IA	Impact Assessment
IAoI	Tractor-loader-backhoe
IFC PS	International Finance Corporation Performance Standards
ILO	International Labour Organisation
IPP	independent power producer
JCM	JCM Matswani Solar Corp Limited
KGV	Kanzimbe Group Village
kV	Kilovolt
LACS	Land Acquisition and Compensation Specialist
LRP	Livelihoods Resettlement Plan
MBS	Malawi Bureau of Standards
MERA	Malawi Energy Regulatory Authority
MITC	Ministry of Trade and Commerce
MW	Mega Watt
NACP	National AIDS Control Programme
NEAP	National Environmental Action Plan
NEP	National Environmental Policy
NGO	Non-Governmental Organisation
ORES	Other Renewable Energy Sources
PPA	Power Purchase Agreement
PV	Photovoltaic
RET	Renewable Energy Technologies
SDG	Sustainable Development Goals
SEP	Stakeholder Engagement Plan
TA	Traditional Authority
TLB	Tractor-loader-backhoe
ToR	Terms of Reference

Abbreviation	Definition
VDC	Village Development Committee
WBG	World Bank Group
WWEC	Waste Water Environment Consultants

1.1

OVERVIEW

JCM Matswani Solar Corp Limited (JCM) (a limited liability corporation in Malawi owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited, and Matswani Capital (PTY) Limited) (herein referred to as 'ProjectCo'). The ProjectCo are planning to develop a 60 megawatt (MW) alternating current solar photovoltaic (PV) plant ('the Project') on a 168 hectare (ha) land plot adjacent to the villages of Kanzimbe and Mayambo, under Kanzimbe Group Village Kalonga Traditional Authority (TA), Salima District situated in the Central Region of Malawi. ProjectCo have agreed on form of Power Purchase Agreement (PPA) with the Electricity Supply Corporation of Malawi Limited (ESCOM) and the power from the Project will be fed directly into the national grid via a short 132 kilovolt (kV) transmission line through to the Nanjoka substation. The transmission line wayleave will be 30m and will impact 57ha of land. The Project will employ approximately 200 workers during construction and 20 during operations.

In total, 225 people have been affected by land acquisition, with the majority of affected land plots comprising under one ha. A Livelihood Restoration Plan (LRP) is in the process of being developed to mitigate impacts from economic displacement (loss of land as result of the Project). The plan will set out the extent and scale of displacement impacts, engagement related to land acquisition, eligibility and entitlements for affected persons and the implementation, monitoring and evaluation requirements.

Environmental Resources Management (ERM) in collaboration with Waste, Water and Environment Consultancy (WWEC) based in Lilongwe, has been appointed by the ProjectCo to undertake the ESIA and LRP in line with the Malawi laws and regulations, as well as the requirements of international finance institutions, namely the International Finance Corporation (IFC) Performance Standards (PS), in order to facilitate lender financing.

It is important to note that the Project will now generate 60 MW and not 40 MW as indicated in the draft ESIA. This change was driven by the Government of Malawi where they indicated that they national grid could accommodate the additional generation. The increase in capacity does not alter the land take for the Project, the additional generation can be achieved within the footprint which was assessed in the draft ESIA. Therefore there are no additional livelihood impacts. Resource use has not increased (conservative estimates were used for the draft ESIA Report) and therefore there is no change in significance of impact ratings.

1.2 *PROJECT COST*

The overall Project investment cost across all phases of the Project is approximately USD 80,000,000.

1.3 *PROJECT PROPONENT*

The ProjectCo is owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited, and Matswani Capital (PTY) Limited.

JCM Power is an independent power producer (IPP) dedicated to accelerating social, economic and environmental sustainability in growth markets through the development, construction and operation of renewable energy facilities and HVDC transmission lines. InfraCo Africa seeks to alleviate poverty by mobilising private sector expertise and finance to develop infrastructure projects in sub-Saharan Africa. InfraCo Africa was approached by JCM and a local developer, Matswani, to co-develop the Project.

Box 1.1 Contact Details of the Applicant

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1.4 *PURPOSE OF THIS ESIA REPORT*

Environmental Resources Management (ERM) has been appointed by the ProjectCo to undertake an EIA in line with the requirements of the Malawian laws (including the Environment Management Act (1996)) and regulations as well as the requirements of international finance institutions.

This Report presents an assessment of the environmental, social and community health impacts associated with the Project activities during the construction and operational activities.

This ESIA has been undertaken in two phases; a Scoping phase and an EIA phase including specialist studies.

The purpose of this ESIA Report is to present the following:

- a detailed description of the proposed Project and relevant Project alternatives;

- the ESIA process and a legal review of legislation and guidelines pertinent to the proposed Project and associated ESIA;
- the outcomes associated with stakeholder engagement activities carried out to date;
- a detailed baseline review of the physical, biological and socio-economic characteristics of the Project area;
- an assessment of impacts to the physical, biological and socio-economic environments related with the different phases (construction, operational and decommissioning phases) of the proposed Project;
- mitigation measures that aim to avoid / minimise/ manage the severity of identified impacts; and
- an assessment of cumulative impacts associated with Project-related developments in the Project area.

1.5 *PROJECT CYCLE AND IMPACT ASSESSMENT PROCESS TO DATE*

1.5.1 *Scoping*

On the basis of the initial design a Project Brief was submitted by ProjectCo to the Environmental Affairs Department (EAD) and received a response on the 6th of January 2018. The EAD is the authority responsible for the environmental permitting process, in line with the requirements of Section 24 of the Environmental Management Act (EMA, No 23 of 1996).

Following a review of the Project Brief, in line with the EMA, it was confirmed by the EAD that the Project required a detailed Environmental Social Impact Assessment (EIA) (See *Annex E* for the EAD Terms of Reference). The term ESIA is used in this report to acknowledge that the assessment evaluated impacts and risks to both environmental (biological, physical) and social (people, livelihoods, socioeconomic, etc.) resources and receptors. In order to comply with national and international requirements, the EIA and ESIA will form one document serving both purposes. We will refer to this report as the ESIA.

Accordingly, ERM undertook a scoping site visit in April 2018, in line with international best practice. A Scoping Report was prepared and submitted to the potential lenders in June 2018. Scoping is the means to identify issues most important to Project planning, decision-making, and stakeholders. During scoping, potential interactions between the Project and Project activities with environmental and social resources and receptors are identified and prioritised in terms of potential risk and impacts. Scoping also identifies the areas which are not likely to have the potential for risks or impacts so that

these can be eliminated from the detailed assessment to follow. The findings of the scoping activities identified potential significant impacts that required further study in the ESIA (see Chapter 4). A number of findings emerged from the scoping consultations (during the scoping visit) (see Chapter 7) with the key actions going forward included in this ESIA.

1.5.2 *Land Acquisition*

The land acquisition for the Project has been undertaken in two phases. Phase I refers to an initial 80 ha plot of land (government-led land acquisition process already completed) and Phase II refers to additional 88 ha plot of land (land acquisition process in progress). The land acquisition process for Phase I was led by the Salima District Office and undertaken at the end of 2017. Phase II land acquisition has been undertaken by the Salima District Office with support from ERM and WWEC. The Ministry of Land (MoL) Report for Phase I land acquisition is included in Annex F and a draft of the MoL Report for Phase II of the land acquisition is also included in Annex F. Please note that the Phase II MoL Report is in draft as the final stages of the compensation is being completed.

This Phase I land acquisition was assessed by ERM under a Land Acquisition and Compensation Specialist (LACS) scope of work (SoW) (herein referred to as 'LACS studies'), to identify measures to align the government-led land acquisition process with international requirements. This has also included development of an overarching Stakeholder Engagement Plan (SEP) to facilitate communications regarding the Project, ongoing establishment of a grievance mechanism, and development of a socio-economic baseline to monitor the impacts of the land acquisition process and to identify impacts to inform this ESIA. Additionally, Corporate Social Responsibility (CSR) feasibility studies have also been undertaken, which has included a community needs assessment and engagement on potential community investment options (herein referred to as 'CSR studies'). The CSR will form part of the ProjectCo's investment into the affected communities.

Both the LACS and CSR studies, undertaken in January 2018, have included providing information on the Project to communities and gathering feedback to inform the outcomes of the scoping process. Further, socio-baseline information gathered during the studies was used for the scoping baseline. In addition, since additional land is required for the Project, further data was gathered and additional engagement was undertaken as part of the ESIA process.

Land acquisition already undertaken is referred to as 'Phase I land acquisition'. Additional land required for the Project is referred to as 'Phase II land acquisition'. 72 people were compensated by Phase I of land acquisition: 50 people in Kanzimbe Village (24 males and 26 females) and 22 people in Mayambo Village (8 males and 14 females). In terms of Phase II, a total of 166 people are impacted (77 males and 89 females).

1.6

IMPACT ASSESSMENT OBJECTIVES

The ESIA process involves the identification, prediction and evaluation of potential environmental and social impacts of a Project and outlines the proposed mitigation measures for residual impacts and enhancement measures for positive impacts which the Project will implement.

The information contained in this Report, along with the comments and inputs from stakeholders and commenting authorities will assist the EAD (the competent authority), in granting the environmental permit for the Project.

The objectives of this impact assessment process are to:

- identify all potentially significant adverse and positive environmental and social impacts of the Project;
- gather baseline data to inform the assessment of impacts and to monitor changes to the environment as a result of the Project and to evaluate the success of the mitigation measures implemented;
- communicate the results of the ESIA process for the proposed Project and alternatives considered;
- ensure that the impacts identified during the ESIA process are assessed;
- present the mitigation and enhancement measures which will be implemented by the Project to manage the impacts identified;
- provide a record of comments and responses received from the stakeholders during the ESIA process; and
- facilitate an informed decision making process by the relevant authorities.

1.7

PROJECT JUSTIFICATION

Malawi has an installed generation capacity of 363 MW, however there is large reliance on large hydropower ⁽¹⁾. Over 95% of Malawi's electricity is generated from hydropower with the Shire River as the main source. Due to drought and low rainfall electricity generation has been reduced by up to 40% due to dwindling water levels ⁽²⁾. However, in Malawi there is also high potential for solar energy development.

(1) USAID (2018), *Malawi Power Africa Factsheet* Accessed at: <https://www.usaid.gov/powerafrica/malawi>

(2) ESCOM (n.d) *An Update On The Current Water Levels And The Energy Situation In Malawi* Accessed at: <http://www.escom.mw/waterlevels-energysituation-malawi.php>

Malawi's energy sector has gone through important sector reform efforts recently, including the partial unbundling of the national utility, the ESCOM ⁽¹⁾. The restructuring of Malawi's power market is underway, with strong investor interest and political will for Independent Power Producers (IPPs) to enter the market ⁽²⁾.

This Project is an investment in renewable energy and will help with the diversification of the energy sector as well as add to increased capacity for the national grid. In addition, the Project is part of the government IPP process and is part of sector reform development.

Finally, there is also a global drive towards the generation and implementation of affordable clean energy. One of the UN Sustainable Development Goals (SDGs) is 'Affordable Clean Energy'. This goal recognises a global economy reliant on fossil fuels, and the increase of greenhouse gas emissions is creating drastic changes to our climate system ⁽³⁾. Therefore, expanding infrastructure and upgrading technology to provide clean energy in all developing countries is a crucial goal that can both encourage growth and help the environment ⁽⁴⁾. This Project aligns with this global initiative to develop renewable energy resources in developing countries.

1.8

STRUCTURE OF THE ESIA REPORT

The remainder of this ESIA report is organised as follows:

- Chapter 2: Project Description
- Chapter 3: Administrative and Legal Framework
- Chapter 4: Impact Assessment Methodology and Scoping
- Chapter 5: Environmental Setting: Biophysical Baseline
- Chapter 6: Social Setting: Socioeconomic Baseline
- Chapter 7: Public Consultation: Stakeholder Engagement
- Chapter 8: Assessment of Positive Environmental and Social Impacts
- Chapter 9: Assessment of Negative Environmental and Social Impacts
- Chapter 10: Environmental and Social Management Plan
- Chapter 11: Impact Summary
- Chapter 12: Conclusion

The ESIA Report is supported by the following annexes:

- Annex A: Project Team CV's
- Annex B: ERM Impact Assessment Methodology

(1) USAID (2018), *Malawi Power Africa Factsheet* Accessed at: <https://www.usaid.gov/powerafrica/malawi>

(2) USAID (2018), *Malawi Power Africa Factsheet* Accessed at: <https://www.usaid.gov/powerafrica/malawi>

(3) UNDP (n,d) *Sustainable Development Goals* Accessed at: <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-7-affordable-and-clean-energy.html>

(4) UNDP (n,d) *Sustainable Development Goals* Accessed at: <http://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-7-affordable-and-clean-energy.html>

- Annex C: Specialist Reports
- Annex D: Stakeholder Engagement Documentation
- Annex E: EAD Terms of Reference
- Annex F: Ministry of Land Compensation Reports

This *Chapter* provides a description of the proposed Project and presents an overview of the key elements and activities involved in the planned construction, operation and decommissioning phases based on available design information.

2.1 PROJECT OVERVIEW AND LOCATION

The Project comprises of a 60 megawatt (MW) alternating current solar photovoltaic (PV) plant on a 168 ha green field site in Kalonga Traditional Authority (TA), Salima District. It is adjacent to the villages of Kanzimbe and Mayambo, under Kanzimbe Group Village (KGV), 20 km from the town of Salima and 88 km from Lilongwe (along on the M5 and M14 road). *Figure 2.1* illustrates a topographical map of the Project.

The solar plant will connect to a new 5 km 132 kV transmission line that runs alongside an existing Electricity Supply Corporation of Malawi (ESCOM) 132 kV transmission line to the Nanjoka substation. Electricity generated will be sold to ESCOM and will be transferred to the national grid via the existing ESCOM Nanjoka substation. The proposed grid connection solution is therefore to establish a new 132 kV feeder bay at the Nanjoka substation, in which the existing 132 kV overhead transmission termination point will be relocated. A new 132kV overhead transmission line will run, from a new on-site switching station at the solar PV plant, parallel to the existing line and terminate in the existing feeder bay at the Nanjoka substation. There will be a 30m wayleave for the transmission line which will result in 57 ha of land being impacted.

The design of the 132kV overhead line, from the solar PV plant to the Nanjoka substation is proposed to be a single circuit overhead line with an optical ground wire (OPGW) which operates as a communications cable. The proposed solution has been agreed with ESCOM in principle, however the final configuration is subject to approval from ESCOM, the Malawian Energy Regulatory Authority (MERA) and stakeholders.

The layout for the Project is shown in *Figure 2.2*

2.2 PROJECT SITE

The Project Site is generally flat land and is predominantly used for agricultural purposes. Crops cultivated in the area include maize, groundnuts, beans, soya and tobacco among others. Trees on the Site include natural and planted and fruit trees such as mangoes are harvested. Within the Project area, residents also rear livestock like cattle, goat and pigs.

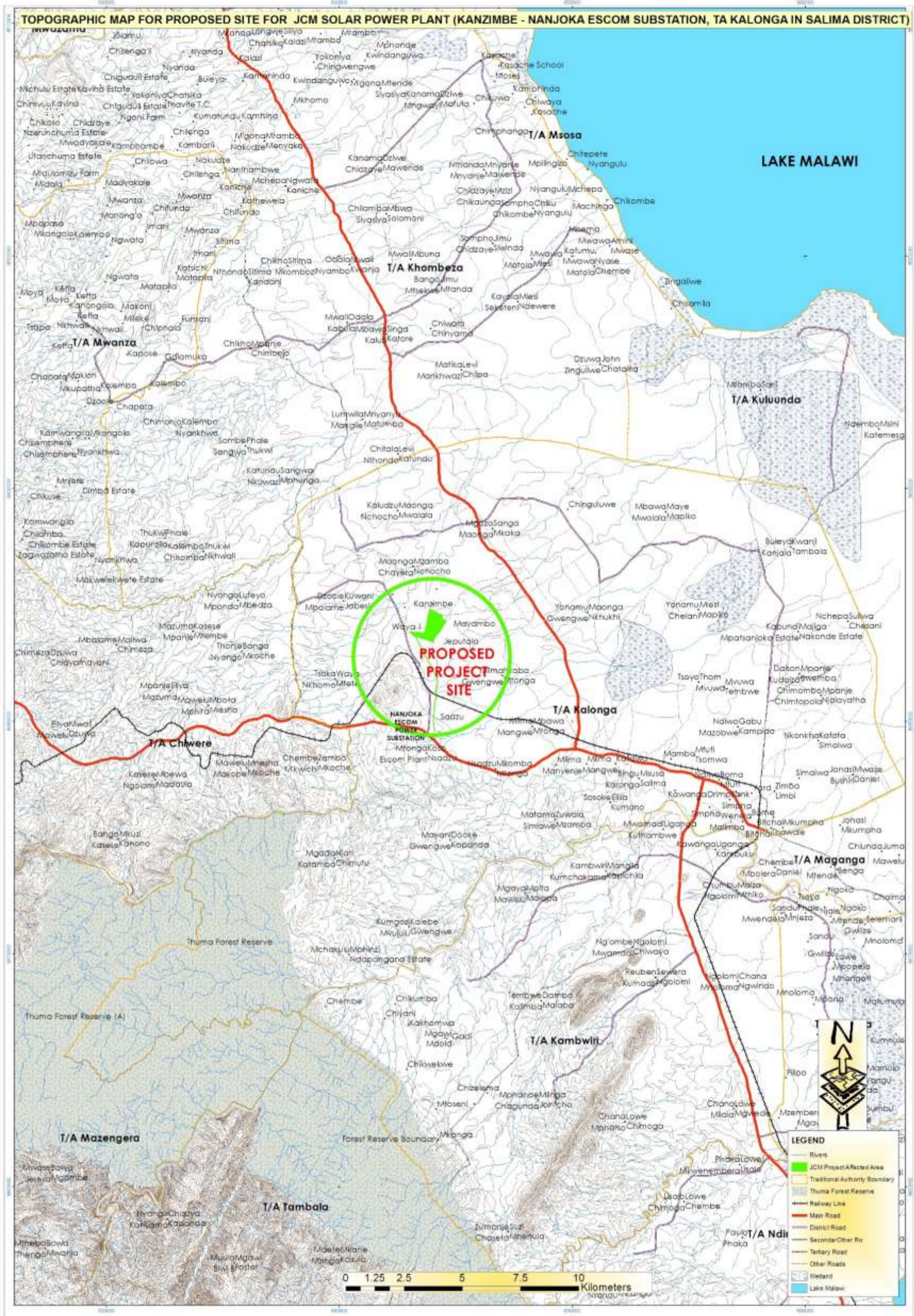
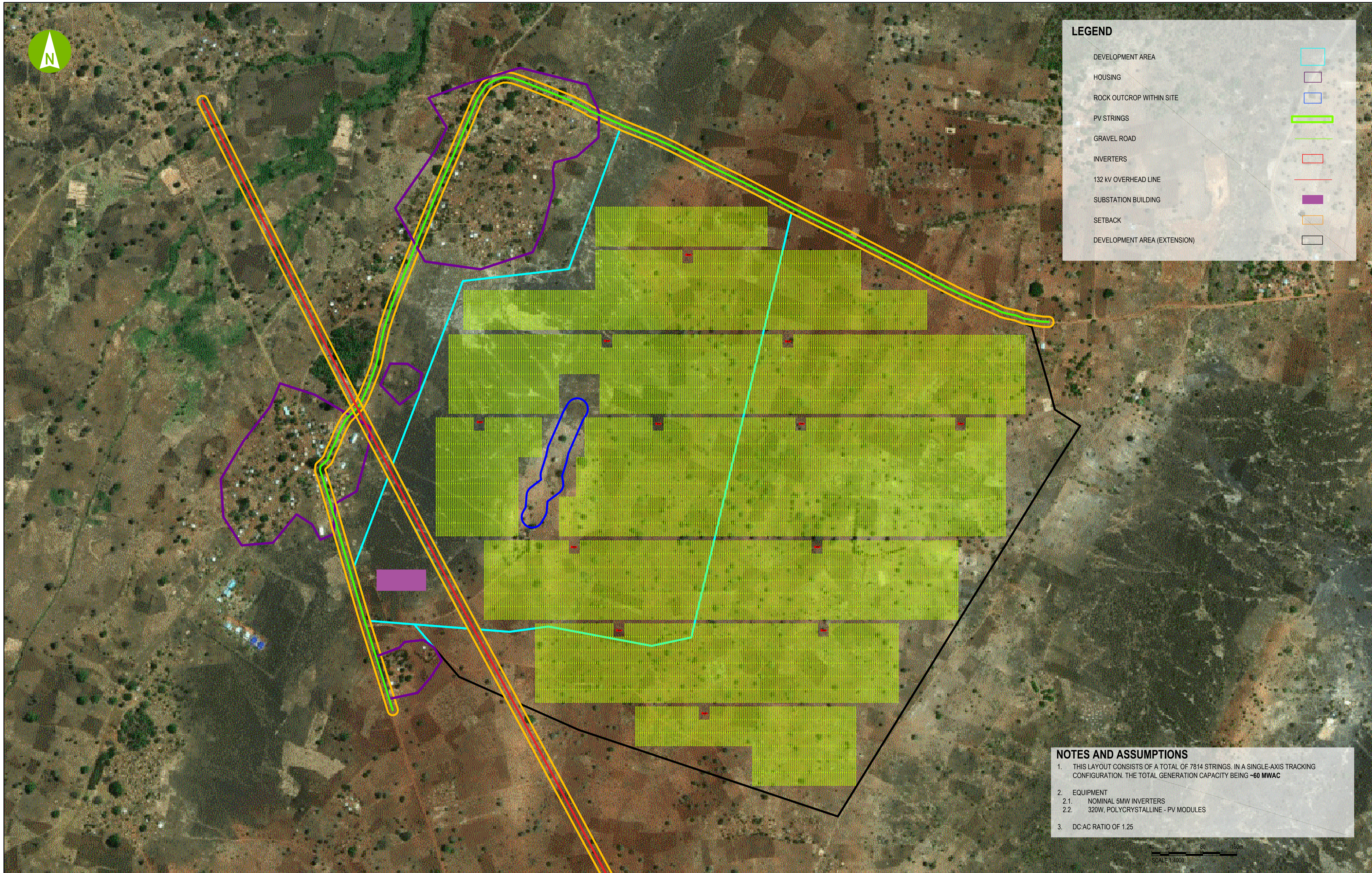


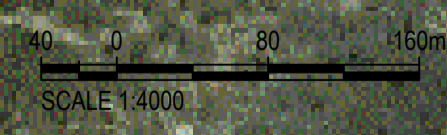
Figure 2.1 Project Location Topographical Map



LEGEND	
DEVELOPMENT AREA	
HOUSING	
ROCK OUTCROP WITHIN SITE	
PV STRINGS	
GRAVEL ROAD	
INVERTERS	
132 KV OVERHEAD LINE	
SUBSTATION BUILDING	
SETBACK	
DEVELOPMENT AREA (EXTENSION)	



NOTES AND ASSUMPTIONS	
1.	THIS LAYOUT CONSISTS OF A TOTAL OF 7814 STRINGS, IN A SINGLE-AXIS TRACKING CONFIGURATION. THE TOTAL GENERATION CAPACITY BEING ~60 MWAC
2.	EQUIPMENT
2.1.	NOMINAL 5MW INVERTERS
2.2.	320W, POLYCRYSTALLINE - PV MODULES
3.	DC:AC RATIO OF 1.25



CLIENT

REV	DATE	REVISION DETAILS	APPROVED
A		ISSUED FOR REVIEW	

SCALE	1:4000
SIZE	A1
DRAWN	M.MODISANE
DESIGNED	M.MODISANE
REVIEWED	J.FOSTER

PRELIMINARY
NOT FOR CONSTRUCTION

APPROVED _____ DATE _____

PROJECT	SALIMA SOLAR PV					
TITLE	SALIMA SOLAR PV PLANT GENERAL ARRANGEMENT DEVELOPMENT AREAS (EXTENDED AREA) - 60MW					
DRAWING No.	PROJECT No.	WBS	TYPE	DISC	NUMBER	REV
501711	001	DRG	GA	008	A	

The predominant land ownership in the Project area is customary whereby the Traditional Authority (TA), in this case Kalonga TA, administers land on behalf of the local community. The TA is mandated by the government to distribute land to individuals as well as address land disputes and report to the government through the office of the District Commissioner (DC).

Approximately 78% of the land in Salima District is under customary land tenure system ⁽¹⁾. The land is mainly used for subsistence farming since most of the people who own the land have some sizeable plots ⁽²⁾. The remaining land is privately or publicly owned; 18% and 4% respectively. Additional information regarding the land ownership system and land uses in the Project area is described in *Chapter 5*.

As mentioned above, 80 ha of land has already been acquired by ProjectCo. An additional 88 ha of land will be acquired in conjunction with the LRP developed for the Project ⁽³⁾. A list of Project Affected Persons (PAPs) are included in *Annex D*.

2.3.1 *Process Followed to Acquire the Land for the Project*

Section 2.8.2 describes how the land for the Project was identified. Once the land for the Project was identified the following actions were undertaken for Phase I land Acquisition.

April 2016: Land Sensitization Meetings

Land sensitization meetings commenced focusing on the following:

- Extensive community engagement sessions aided by Ministry of Trade and Commerce (MITC) and facilitated by District Commissioner (DC), Traditional Authority (TA), and District Lands Officer (DLO); and
- After extensive engagement, the ProjectCo received approval to allow Ministry of Lands to conduct a survey.

May-July 2016: Community Engagement and initial Survey by Ministry of Lands

- The ProjectCo met with all stakeholders to go over the site and land requirements.
- Owners were contacted to ensure that they were satisfied for Ministry of Lands to conduct the survey.

(1) Salima District (2006) *Salima Socio-Economic Profile*, Salima

(2) Salima District (2006) *Salima Socio-Economic Profile*, Salima

(3) The LRP for the Project will integrate gender issue into proposed plan to mitigate resettlement impacts.

- The ProjectCo/MITC/Ministry of Lands conducted the preliminary survey.
- Once the preliminary survey of the available land was undertaken an additional 20Ha was added to the initial 30Ha, taking the total land to 50Ha.
- Results of survey were satisfactory and Ministry of Lands engaged by the ProjectCo to conduct valuation.

August 2016: Ministry of Lands Valuation

- Ministry of Lands conducted detailed survey and valuation.
- Full Ministry of Lands assessment facilitated by Local Government, Chiefs and owners completed over a 2-week period.

September 2016: Draft Ministry of Lands Report and Dispute Resolution with specific Owners

- Ministry of Lands completed survey and valuation report for 50Ha.
- Local Government engaged through the DC to run a separate process to increase land take for the Project from 50Ha to 80Ha.
- Local Government/ProjectCo community engagement session to sensitize affected community members.

October 2016: Additional 20Ha Identified

- Ministry of Lands conduct full survey and valuation of the additional 20Ha.
- Valuation agreed between the ProjectCo and Ministry of Lands.

November 2016: Ministry of Lands Presentation to Land Owners

- Ministry of Lands and DC presented the land values to the owners and all owners expressed willingness to sell.
- ProjectCo/Ministry of Lands/MITC made several iterations and additions to the final report.
- ProjectCo undertook compensation payment.
- Process initiated to convert from customary owned land to leasehold land.

December 2016- January 2017: Provisional Lease

- Provisional lease to be completed to accommodate ESCOM tendering process and in January 2016 the provisional lease was received.

September 2018: Summary of Phase II Disbursement

Land Acquisition for Phase II has almost been completed. Disclosure and Disbursement for Phase II occurred between the 19th and 26th of September 2018. The land acquisition process for Phase II followed a similar process as above. The Ministry of Lands was engaged to undertake the survey and acquisition with additional support from the ProjectCo and ERM.

The initial disclosure to the PAPs for Phase II was undertaken on Wednesday the 19th of September 2018 with approximately 100 people present at the initial meeting. After the meeting the start of the individual negotiations also took place. The MoL ran an objections desk, where 19 total people made an objection to through the course of the first day. The main objections were - missing copy of the form, disagreement about the measurements of the land, and disagreement about the number of trees.

All objections related to the negotiations were heard with about 12-15 PAPs with objections. The MoL took each PAP through their compensation and how it was calculated. Issues centred on measurements of acres vs hectares, number of trees, and information from survey forms not carried over correctly into the database and final forms. After these individual meetings, just two PAPs ultimately wanted to go out to their plots for re-measurement. In both cases the PAPs were allowed to carry the GPS tracker and in both cases an error was discovered, which was then documented by the MoL. All objections were resolved and updated forms generated.

Final disbursement is expected to be undertaken by the end of September/beginning of October 2018.

2.4

PROJECT COMPONENTS

Solar energy systems produce energy by converting solar radiation into electricity or heat. The proposed Project will use PV solar technology to generate electricity (*Figure 2.3*).

How a Solar PV works

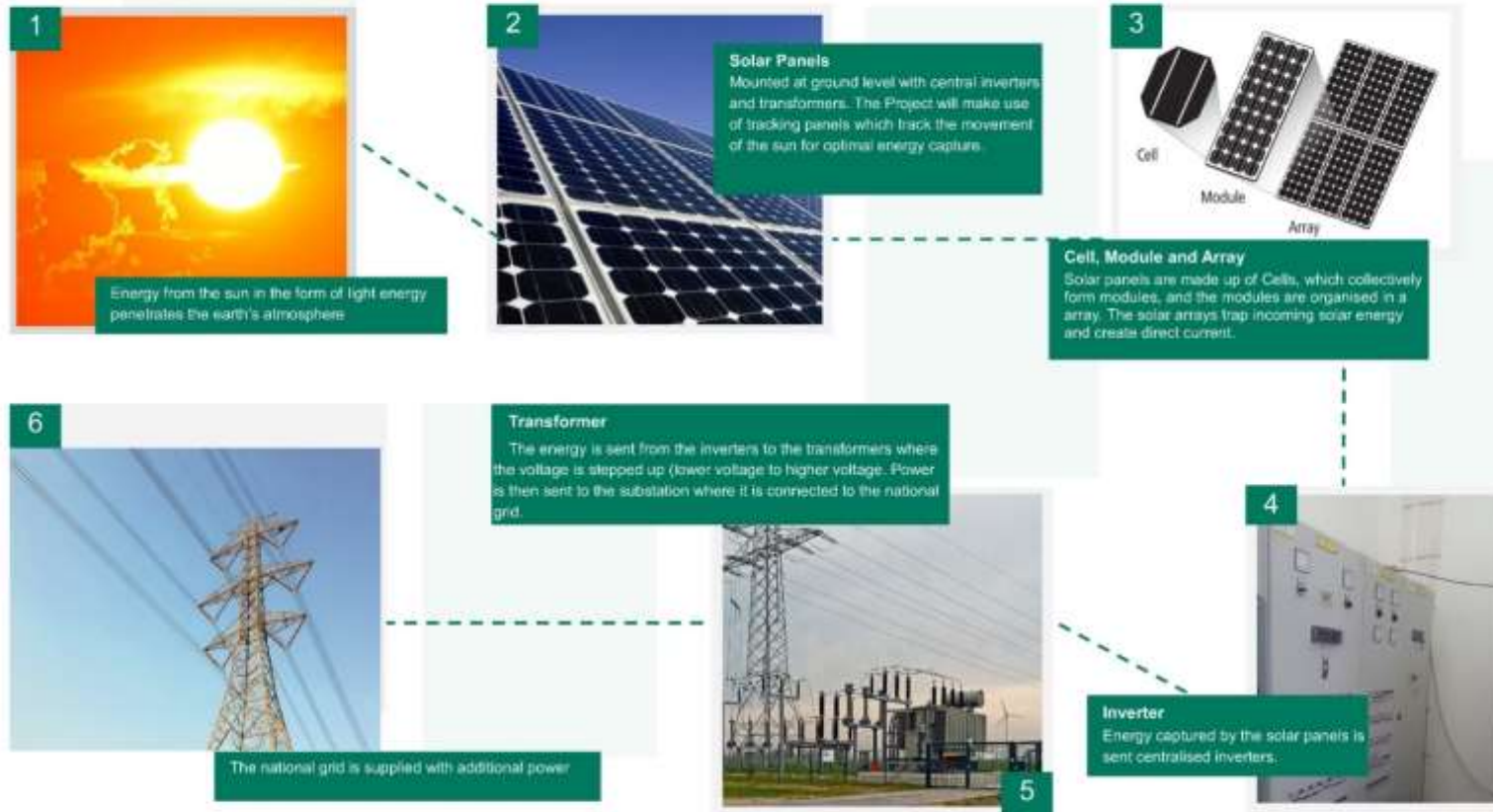


Figure 2.3 How Solar PV Works (Source ERM, 2018)

The PV solar technology chosen for this Project consists of the following main components:

- **PV cell:** The PV cell is the device that generates electricity when exposed to solar radiation. The absorbed solar energy excites the electrons inside the PV cell and produces electrical energy. All PV cells produce Direct Current (DC). There are three main types of solar cells:
 - Monocrystalline – made from a single silicon crystal;
 - Polycrystalline – made from multiple silicon crystals; and
 - Thin film – common material used for thin film modules are cadmium telluride (CdTe) and copper indium gallium selenide (CIGS).

The Project will use poly-crystalline solar modules, potentially model CS6U – 320p 1500V, or similar depending on market availability, best pricing and final technical design. The Project will use 227,280 panels.

- **PV module:** The PV module is the set of interconnected photovoltaic cells encapsulated between a transparent front (usually glass) and a backing support material then mounted in an aluminium frame. The modules will appear dark blue or black and will be mounted in an aluminium frame. The modules are designed to absorb the solar radiation and hence are not susceptible to reflection or glinting. The glare and reflectance levels from a given PV module are decisively lower than the glare and reflectance generated by a standard glass.
- **Mounting structures:** Multiple PV modules are bolted onto a mounting structure which tracks the sun's progress across the sky in an east to west direction. The mounting structures will be either steel or aluminium sections extending between 1 and 3 m into the ground depending upon the ground conditions. Approximately 20 to 40 modules will be fitted per frame. There will be approximately 4 to 6 m spacing between each row.
- **PV array:** The PV array is the complete power generating plant consisting of multiple PV modules wired in series and in parallel. The PV modules will be connected by DC cables to combiner boxes mounted underneath the PV module mounting structures. Each combiner box will occupy an area of approximately one square metre. The power generated by many PV module strings is combined in the combiner box and transmitted via underground 400 V-1000V DC cables to an inverter and transformer enclosure.
- **Inverter:** The inverter converts the DC to AC. The inverter and transformer are anticipated to be housed within the same inverter station housing (typically an insulated, steel-framed 20-foot shipping container). The transformers transform the low voltage AC from the inverter to

medium voltage. There will be approximately 1,429 inverters for the Project.

- **Substation:** The substation receives all power from the inverters via underground cables and provides protection and control equipment required to safely manage the plant and to ensure grid code compliance regulations. The substation will consist of at least one small building, outdoor electrical plant and equipment and the transformers and will be approximately 2000 m².
- **Transformer:** The transformer steps up the AC power from the inverters (typically at 33 kV) to match the grid voltage (expected to be 132 kV).
- **Stores, offices, guardhouse and control building:** A small building containing space for spares, office seating, welfare facilities and computer control equipment will be located near the substation approximately 100 m² in size. This building will be on the perimeter of the plant. The guardhouse will include a small kitchen and toilet. Building will include a storeroom for spare parts kept onsite. The control room will contain switchgear and monitoring equipment for the PV plant. The buildings will be a standard height of approximately 3 m.
- **Access tracks and fencing:** The Project will include tracks throughout the site to permit access for maintenance vehicles and personnel. Vegetation (such as grass) will be permitted to grow throughout the site but will be kept low. A security fence, alarm system, and close circuit television security cameras will surround the site.
- **Balance of system:** The remaining components that will make up the Project, commonly referred to as 'balance of plant' components, typically include, but are not limited to, combiner boxes, DC cables, trenches, power conversion stations, AC cables and earthing and lightning protection.
- **Transmission line:** a 132 kV transmission line will connect the Project and the Nanjoka substation. The transmission line will be 5 km long and have 16 poles at a spacing of 300 m. The wayleave for the transmission line will be 30m.
- **Connection to the grid:** The grid connection requires transformation of the voltage from 480 V to 132,000 V. The normal components and size of a distribution rated electrical substation will be required. A small switching station for the plant will be located on the outside of the control room.

Key Project components for the Project will be source by the EPC Contractor and most likely be sourced from China.

2.5 *PROJECT ACCESS*

The existing access road from the M14/M5 road to Kanzimbe is expected to be used as the primary access to the site. This access road will be upgraded to permit heavy goods vehicles to pass safely. Solar PV component and materials are likely to arrive via cargo ships in Mozambique, and the transported via road networks to the Project site. It is expected that the best route is likely to be through Mozambique from either the port at Beira or that at Nacala. These routes cover a significantly shorter overland distance compared to the alternatives through Tanzania, South Africa or Zambia and appear to be the main routes for the import and export of goods to Malawi

2.6 *PROJECT PHASES*

2.6.1 *Project Planning and Design*

The Project has been in the Project planning and design phase since June 2015. During this time multiple pre-feasibility and feasibility studies and engagement with government and community stakeholders have been undertaken. The studies that have been undertaken during this phase include:

- Grid Analysis and Market Review.
- Site Pre-feasibility Study.
- Feasibility Study.
- On-site Weather Station and Energy Assessments.
- Land Acquisition and Compensation Study.
- Corporate Social Responsibility Study.

In addition this ESIA and the LRP are also part of the studies conducted during this phase.

2.6.2 *Site Preparation and Construction Phase*

This phase of the Project will involve the clearance of vegetation, installation of fencing and levelling of the site and preliminary earthworks. The site will be marked out by a contractor lay down area, safety and security fencing installed, the access road will be upgraded, and site access tracks will be constructed.

The construction phase will be initiated following the completion of site preparation activities. During the construction phase the following activities will take place:

- transportation and of equipment and components to site;
- establishment of workshops, temporary laydown areas;
- excavation of cable trenches;
- ramming or drilling of the mounting structure frames (depending on the geotechnical condition of the ground);

- installation of the modules onto the frames;
- installation of measuring equipment;
- laying of cables between the module rows to the inverter stations;
- construction of inverter and transformer station foundations and installation of inverter stations;
- construction of transmission lines, switch stations and upgrades/expansions at the Salima (Nanjoka) substation;
- construction of stores, workshop and office buildings;
- testing and commissioning; and
- removal of equipment and demobilisation of construction team.

The following facilities will be constructed:

- workshop and maintenance area;
- stores (for storing and handling fuel, lubricants, solvents, paints and construction material);
- contractor lay-down areas;
- mobile site offices;
- temporary waste collection and storage area; and
- parking area for cars and equipment.

Construction will occur over 12-18 months and it is anticipated that during this phase there will be approximately 100-200 construction workers (skilled and unskilled) on the Project Site.

During construction the primary Project components will be delivered in the following way:

- inverters - eight truck deliveries ;
- main Transformer - two specialised abnormal load deliveries ;
- LV/MV Transformers – Eight truck deliveries;
- PV modules – 200 truck deliveries;
- tracker/structure – 300 truck deliveries; and
- miscellaneous – 200 truck deliveries.

2.6.3 *Operational Phase*

The solar PV power plant will be operated on a 24 hour, 7 days a week basis (although generation of electricity will only occur during sunlight hours).

Operational activities will include:

- cleaning of the modules by trained personnel using a high pressure water hoses;
- vegetation management for under and around the modules to allow maintenance and operation at full capacity;

- maintenance of all components including modules, mounting structures, trackers, inverters, transformers switching station plant and equipment;
- control room management and maintenance of the welfare facilities;
- supervision of the electricity production; and
- site security monitoring.

During operations it is estimated that there will be up to 20 workers on the Project Site and minimal Project related traffic. The breakdown of workers will be as follows:

- Skilled (8 workers)
 - Technicians.
 - Operators.
 - Security (negotiable if you classify that as skilled).
- Unskilled (12 workers)
 - General facility housekeeping (Weeding).
 - Panel cleaning.
 - Cleaners.

2.6.4 *Decommissioning Phase*

The proposed Project is expected to operate for at least 20 years. Once the plant reaches the end of its life, the PV modules may be refurbished or replaced to continue operations or the facility may be closed and decommissioned. If decommissioned, all components would be removed and the site rehabilitated. Where possible all materials will be recycled, otherwise they will be disposed of in accordance with local regulations and international best practise and approximately 120 workers will be required.

2.7 *PROJECT EMISSIONS AND RESOURCE USE*

2.7.1 *Wastewater*

Construction

Wastewater from construction activities include the following:

- temporary sanitary facilities;
- storm water; and
- drainage over potentially contaminated areas (e.g. concrete batching/ mixing areas and equipment storing areas).

Operation

During operations wastewater will arise from onsite sanitary facilities and run off from panel cleaning activities.

2.7.2

Air Emissions

Construction

Emissions during construction will vary in magnitude, frequency and duration for the various construction activities required. During construction, temporary air emissions will be associated with the following activities:

- combustion emissions from the operation of construction machinery and generators;
- particulate (dust) emissions from exposed areas and earthmoving activities;
- vehicle emissions from supply vehicles and generator operation; and
- welding operations.

The following construction vehicles/machinery will be onsite during the construction period:

- two Dump trucks;
- three Bob Cats;
- one tractor;
- four Water truck;
- four Tractor-loader-backhoe (TLB)s;
- ten Pick-up trucks; and
- three Excavators.

The potential impacts from air emissions during construction are assessed in in *Chapter 9*.

Operations

Little to no emissions are anticipated during the operational phase through management of on-site vehicle speed and vegetation and soil landscaping. As illustrated in *Chapter 4*, air quality impacts during operations have been scoped out of further assessment.

2.7.3

Noise Emissions

Construction

The construction phase will be characterised by noise generated by diesel mobile construction and earth moving equipment, drilling, and foundation work. Traffic associated with the transport of construction materials, transformers, turbine-generator units etc. and construction workers will also result in increased noise levels along transport routes.

The potential impacts from noise emissions during construction are assessed in *Chapter 9*.

Operations

The operation of the solar PV power plant is not expected to generate significant noise emissions.

As illustrated in *Chapter 4* air quality impacts during operations have been scoped out of further assessment.

2.7.4

Non-Hazardous and Hazardous Waste

Construction

During construction, wastes will comprise of general domestic waste including sanitary and food waste, office waste and organic material. Petrol and diesel by-products will be generated from the transport of goods and personnel, generators and heavy construction equipment.

Large quantities of non-hazardous waste will be generated from the solar PV panel packaging material, which typically arrive in wooden pallets. The disposal and possible recycling of these materials will be investigated.

Operations

Minimal waste is expected to be generated during the operations phase. Hazardous materials used on site during operations will include fuels, oils, lubricants, cleaning products, and specialised gases (for use in switchgear). Oil that needs to be replaced will be recycled, if possible, or safely stored and removed from the site and correctly disposed.

2.7.5

Waste Management

Solid Waste

Waste will be separated at source, and labelled bins provided within the facility for the storage of the various categories. Staff will be trained in proper waste management practices and the importance of implementing them.

Cleaning staff will be trained in safe handling and storage of waste and hazardous materials; they will also be provided with adequate PPE.

During construction all hazardous waste will be removed by the EPC contractor and safely disposed of in a licensed facility. The ProjectCo will investigate the possibility of recycling non-hazardous waste. Non-recyclable non-hazardous solid waste will be sent to the Salima waste site.

During operations it is estimated that 50 kg of domestic waste will be produced weekly by the 20 person workforce. Industrial waste production will be occasional (e.g. solar panels, electrical waste) as they will only require disposal if they become damaged.

Wastewater

The EPC contractor will manage construction wastewater. Any hazardous wastewater will be stored on site, and treated (if required) before disposal.

During operations, there will be minimal sewage from sanitary facilities. These facilities will operate on a septic tank system and the ProjectCo will arrange for safe disposal of waste from the septic tank.

Run-off from the panel cleaning or storm water are not expected to be contaminated and adequate drainage of the site will be a design requirement for the Project Site.

2.7.6 *Energy and Fuel Requirements*

Electricity during the construction phase will be provided through the use of diesel powered generators. It is estimated that 5 x 24kW generators running at $\frac{3}{4}$ for 10 hours a day, 5 days a week for 36 weeks will satisfy the electricity requirements of the office trailers during construction. Therefore, the estimated consumption of fuel during construction for office trailers is 48,6000L.

It is estimated that 10 x 8kW generators running at $\frac{3}{4}$ for 6 hours a day, 5 days a week for 36 weeks will satisfy the electricity requirements of the operations of equipment during construction. Therefore, the estimated consumption of fuel during construction for equipment use is 18,360L.

Operations

Once operation has been established, the facility will be supplied with the solar generated electricity, electricity purchased from ESCOM when the plant is not generating electricity, and diesel-powered generators when there is no supply from the facility or the grid.

It is estimated that 1 x 200kW generator running for 10 days a year for 8 hours at full load will satisfy the electricity requirements during operations,

specifically for lighting of offices and other administrative functions. Therefore, the estimated consumption of fuel during operations is 4,280L/year.

2.7.7 *Water Requirements*

Construction

Water for construction activities will be sourced from the boreholes on site ⁽¹⁾. Uses will include construction activities such as concrete mixing, and sanitary facilities for workers. It is estimated that the Project will require up to 7000 cubic metres of water during construction.

Operations

Water usage during this phase will include domestic use and panel cleaning. It is estimated that up to 4000 cubic metres of water per annum will be required for panel cleaning during the dry season. Water will also be required for onsite staff which is approximately 30 litres per worker per day. All water for the Project will be obtained from the boreholes within the facility.

2.7.8 *Chemical Requirements*

No chemicals will be used apart from those present in construction materials such as paint and solvents.

2.8 *PROJECT ALTERNATIVES*

The following alternatives have been considered in the design phase of the Project:

2.8.1 *Activity Alternatives*

ProjectCo was awarded preferred bidder status through ESCOM's competitive tender for the supply of solar PV in 2016/2017. As such, the tender specified solar PV as the activity to generate power resulting in no activity alternatives being investigated.

2.8.2 *Location Alternatives*

The ProjectCo followed a rigorous process in order to select the land adjacent to the Kanzimbe community in Salima District. A summary of the Process I described below.

(1) It is noted that water abstracted for the Project will require permitting and necessary permits will be obtained prior to construction and operations

June 2015: Pre- Feasibility Study

The ProjectCo engaged a 3rd Party contractor to carry out a full prefeasibility study. The study included the following:

Part 1: Grid Analysis and Market Review:

- Grid analysis for the connection of a 25 – 50 MW PV plant.
- General analysis of electricity market in Malawi.

Part 2: Site Pre-feasibility

- Provide a shortlist of suitable priority connection options.
- Strategy to identify the most optimal site was based on the following:
 - Solar Resource.
 - ESCOM Grid infrastructure.
 - Social and environmental impact.
 - Terrain.
 - Associated infrastructure.

Potential areas in Malawi were reviewed based on the factors above. It was decided that the area around Salima was optimal.

July/August 2015: Preliminary Site Selection Process

3rd party consultant hired to evaluate prospective land per the following:

- Area of focus is 15km North of Salima through to 15km South of Golomoti.
- Flat land with little to no gradient.
- Ideally within 0-5 km from connection (132KvA line or substation) but up to max 8Km.
- Sparsely Populated.
- Good access roads.
- 60 to 80 Hectares land size.
- Land cannot be on a flood plain.

Five prospective site were uncovered, two in Salima and three in the Golomoti region.

September 2015: Further Site Selection

- Further analysis was done on the five prospective sites. It was decided to focus on the area around Salima largely owing to the radiation levels in the area.
- The ProjectCo engaged the District Land Officer (DLO) to assist in expanding the search in the Salima area.
- Five focus areas were identified in the Salima region. Various local government officials and owners engaged.

- Two shortlisted sites identified, one adjacent to the substation and one a few kilometres to the North of the substation.
- ProjectCo and local government initiated first community/owner engagement sessions for site adjacent to substation

November 2015 – March 2016: Land Negotiations

Land negotiations with DLO and traditional leaders were undertaken. Through this process the current site in Salima was identified. Following the identification the ProjectCo has undertaken all required steps for the leasing of land according to Malawi regulatory requirements.

2.8.3 *Technology Alternatives*

Various technology alternatives will be investigated as part of the EPC bidding process for the Project. The ProjectCo has shortlisted ten EPC contractors. Each EPC bid will include a variety of technical specifications which will then be evaluated by the ProjectCo.

2.8.4 *No-go Alternative*

If the Project is not undertaken then Malawi will not receive the significant increase in power generation for the country. In addition, temporary benefits from construction employment and permanent benefits from operational employment will not be realised. CSR programs to offset loss of livelihoods as a result of land take for the Project will not be undertaken.

3.1 INTRODUCTION

This *Chapter* presents an overview of the national environmental and social legislation and policies applicable to the Project, as well as the relevant international treaties, conventions and best practices (e.g. international treaties and conventions to which Malawi is party and financial institution standards).

Information in this section is largely drawn from World Bank ⁽¹⁾ documentation as well as the Southern African Development Community (SADC) Handbook ⁽²⁾.

3.2 MALAWIAN INSTITUTIONAL FRAMEWORK

3.2.1 *Constitution of Malawi*

The Constitution of the Republic of Malawi, 1995, is the supreme law of the country. The Constitution recognises that responsible environmental management can make an important contribution towards achieving sustainable development, improved standards of living, and conservation of natural resources (SADC, 2012). The Constitution states that the environment of Malawi should be managed in order to:

- prevent the degradation of the environment;
- provide a healthy living and working environment for the people;
- accord full recognition of the rights of future generations by means of environmental protection; and
- conserve and enhance biological diversity.

The Constitution also includes a framework for the integration of environmental consideration into development programs. Therefore Government, its partners and the private sector have a responsibility to ensure development programs and projects are undertaken in an environmentally responsible manner.

The Constitution also sets the legislative basis for land acquisition in the country. Section 28 (2) of the Constitution states that “No person shall be arbitrarily deprived of property” and section 44 (4) states that “Expropriation of property shall be permissible only when done for public utility and only

(1) World Bank (2013), Independent Environmental Impact Assessment for the Upgraded Kamuzu Barrage - Final ESIA Volume 1: Main Report, World Bank

(2) Walmsley, B and Patel, S, 2011. Handbook on environmental assessment legislation in the SADC region. 3rd edition. Pretoria: Development Bank of Southern Africa (DBSA) in collaboration with the Southern African Institute for Environmental Assessment (SAIEA)

when there has been adequate notification and appropriate compensation, and appeal mechanism exists.

With regard to women's rights, Section 24 of the Constitution states that *"Women have the right to full and equal protection by the law and have the right not to be discriminated against on the basis of their gender or marital status which includes (a) to be accorded the same rights as men in civil law, including equal capacity to (i) enter into contracts, (ii) acquire and maintain rights in property, independently or in association with others, regardless of their marital status.*

Applicability to Project

As the Project is located in Malawi it must abide by all applicable legislation. The Constitution of the country provides the overarching framework for all laws including environmental legislation.

3.3 NATIONAL POLICIES AND PLANS

3.3.1 National Environmental Action Plan (2004)

The NEAP was prepared in 1994 (updated in 2004) in response to Agenda 21 (Rio 1992 Declaration) as action plan for integrating environmental issues into socio-economic development programs. The objectives of the NEAP are to:

- document and analyse all major environmental issues and measures;
- promote sustainable use of natural resources; and
- develop an environmental protection and management plan.

The NEAP outlines actions that need to be considered to ensure adequate environmental protection. For example, EIAs will be required for any development that may affect fragile ecosystems and Government will ensure that workers are supplied with the appropriate protective equipment during construction and operation.

Applicability to Project

The Project has the potential to negatively impact the surrounding environment and therefore an ESIA is required. In the ESIA impacts and management measures are detailed and a management plan included in accordance with the objectives of the NEAP.

3.3.2 National Environmental Policy (2004)

The National Environmental Policy (NEP) aims to create a balance between protection of natural resources and national development. The Policy promotes sustainable social and economic development through sound management of the environment and natural resources. The policy seeks, among other things, to:

- secure an environment suitable for their health and well-being for all citizens of Malawi;
- promote efficient utilisation and management of the country's natural resources and encourage self-sufficiency in food, fuel wood and other energy requirements;
- facilitate the restoration, maintenance and enhancement of the ecosystems and ecological processes essential for the functioning of the biosphere and prudent use of renewable resources;
- integrate sustainable environment and natural resources management into the decentralised governance systems and ensure that the institutional framework for the management of natural resources supports environmental governance in local government authorities;
- enhance public education and awareness of various environmental issues and public participation in addressing them; and
- promote local community, NGO and private sector participation in environment and natural resources management.

In the NEP, there are strategies on environmental planning and environmental impact assessment. The objective on environmental planning is to ensure that national and district development plans integrate environmental concerns, in order to improve environmental management and ensure sensitivity to local concerns and needs.

Applicability to Project

In terms of EIA's the objective of the NEP is to regularly review and administer the guidelines for EIAs, audits, monitoring and evaluation so that adverse environmental impacts can be eliminated or mitigated and environmental benefits enhanced

3.3.3 National Land Policy (2002)

The policy guides land management and administration issues, provides definitions of land ownership categories, and describes details on compensation payment for land.

In terms of land use planning, the policy provides that land allocation should make effective use of land and take into account environment and welfare of community. In terms of environmental management, the policy aims at lending support to the policies and strategies that are already in place. The policy covers issues related to both urban and rural management of solid and liquid waste, protection of sensitive areas, agricultural resource conservation and land use, community forests and woodland management, over-dependence on fuel wood, forest programs, co-ordination of multiple land

use, water resources and wetlands, lakeshore environmental management and mining and minerals.

Applicability to Project

The Project includes a land acquisition process and therefore the contents of the policy are applicable.

3.3.4 National Water Policy (2004)

Malawi's policy on water resources management requires that:

- Water should be managed and used efficiently and effectively in order to promote its conservation and future availability in sufficient quantity and acceptable quality; and
- All programs related to water should be implemented in a manner that mitigates environmental degradation.

Applicability to Project

ProjectCo will draw water for the Project from groundwater resources. Permits for water abstraction are not part of the ESIA process but require the approved ESIA as part of the application. Once the ESIA has been obtained, ProjectCo will apply for the water use licence

3.3.5 National Energy Policy (2013)

Other Renewable Energy Technologies

The Policy describes the technical barriers to include lack of capacity in manufacturing, distributing, installing and maintaining Renewable Energy Technologies (RETs). Financial barriers to include high initial cost, a large proportion (45%) of which emanates from import duties and surtaxes. Other key financial barriers are lack of dedicated and affordable financing mechanism, lack of financiers and suppliers knowledge about establishing dedicated financing mechanisms and appraising applications for credit, lack of skills to develop business plans, lack of knowledge about local, regional and international financial facilities for RETs, lack of confidence in RETs and low returns on investment (for financiers) and the non-availability of loans (for end users).

Institutional barriers include lack of standards and regulatory framework, limited delivery modes, small number of RET companies, a latent market and a small number of qualified technicians to undertake installations. Lack of deliberate policies and strategies; and lack of information about the efficacy of RETs among policy makers, NGOs and the public have further contributed to

the entrenchment of institutional barriers. Social-cultural barriers include gender insensitivity in the design and operation of some RETs.

Applicability to Project

The Project is investing in renewable energy and is therefore in line with the Policy.

3.3.6 *National HIV/AIDS Policy (2003)*

The National HIV/AIDS Policy (2003) provides technical and administrative guidelines for the design, implementation, and management of HIV/AIDS interventions, programs and activities at all levels of the Malawi society. It offers:

- guidance on critical intervention areas, for example social and economic support for people living with HIV/AIDS;
- provision of care and support for treatment to achieve a better quality of life for all Malawians living with HIV/AIDS; and
- protection of their human rights and freedoms.

The goals of the National HIV/AIDS Policy are to:

- prevent the further spread of HIV infection; and
- mitigate the impact of HIV/AIDS on the socioeconomic status of individuals, families, communities and the nation.

Applicability to Project

Potential HIV/AIDS impacts will be investigated in the ESIA. Mitigations measures to combat impacts will be in line with the National Policy.

3.3.7 *National Health Policy, 2008*

The overall goal of the National Health Policy is to improve the health status of all the people of Malawi by reducing the risk of ill health and the occurrence of premature deaths⁽¹⁾.

(1) WHO, Malawi- Analytical summary - General country health policies, n.d. Accessed at: http://www.who.int/profiles_information/index.php/Malawi:Analytical_summary_-_General_country_health_policies (31/10/2017)

The National Health Policy acknowledges the inadequate resources available for the health sector hence it also defines the Essential Health Package, which will be available to all Malawians free of charge ⁽¹⁾.

Applicability to Project

ProjectCo is committed to ensuring that health of workers and the surrounding communities is not impacted negatively.

3.3.8 Republic of Malawi Gender Policy, 2008

The policy ⁽²⁾ focuses on building a society where men, women, boys and girls equally and effectively participate in and benefit from development process. A key aspect of this is to increase land ownership for women and promote women's participation in community afforestation, water, land.

Applicability to Project

ProjectCo will (where possible) promote gender equality in Project aspects.

3.4 ENVIRONMENTAL LEGISLATION

3.4.1 Environment Management Act (1996)

The Act includes provisions on protection, management, conservation and sustainable utilisation for almost all forms of the environment. The Act provides for EIA and gives power to the Minister to publish details of projects that shall not be implemented without an EIA. A list of projects for which EIA is required is described in the Guidelines for EIA.

Part IV of the EMA makes provision for pollution control for air and water pollution and the Act prohibits the discharge of pollutants into the environment. In addition, the Act includes that it is the duty of every person to prevent the discharge of any pollutant into the environment otherwise than in accordance with specifications made by the Minister or director. Moreover, the Minister is able to direct anyone to prevent and/or minimise any pollutant discharged into the environment. Finally, any discharge of pollutants is in accordance with the EMA; however no regulations have been published.

Section 24 of the EMA provides information on the need for projects for which an EIA may be required. Details are as follows:

(1) WHO, Malawi- Analytical summary - General country health policies, n.d. Accessed at: http://www.who.int/profiles_information/index.php/Malawi:Analytical_summary_-_General_country_health_policies (31/10/2017)

(2) Government of Malawi, Gender Policy 2008. Available at <https://cepa.rmportal.net/Library/government-publications/National%20Gender%20Policy%202008.pdf> (accessed 2017)

- the Minister may specify types and sizes of projects which shall not be implemented unless an EIA is undertaken;
- before implementing a project that requires an EIA the project developer must submit the following information to the Director of the EAD:
 - the description of the project;
 - the activities that shall be undertaken in the implementation of the project;
 - the likely impact of those activities on the environment;
 - the number of people to be employed by the project (construction and operation);
 - details of the environment likely to be affected by the project; and
 - any information that the Director deems to be relevant to the project.
 - the Director may require the developer to provide, further information as necessary with regards to details of the project.

Applicability to Project

A Project Brief has been submitted to the EAD which outlined the scope of the Project. The EAD confirmed that an EIA was required. This ESIA satisfies the requirements of the EMA.

3.4.2

Guidelines for Environmental and Social Impact Assessment (1997)

Subsequent to the promulgation of the Environment Management Act, the EIA Guidelines of 1997 were developed with the purpose to improve decision making and to ensure that projects under consideration and development are environmentally sound and sustainable (Republic of Malawi, 2014).

A revised set of guidelines have been drafted in 2014 but not yet approved. The purpose of these *Guidelines, for Environmental and Social Impact Assessment (ESIA)*, is to facilitate compliance with Malawi's ESIA requirements by Government, project developers, donors and the general public (Republic of Malawi, 2014).

Applicability to Project

This EIA document follows the EIA process by submitting a Project Brief to the Director of EAD and then preparing an EIA for approval by licencing authorities.

3.4.3 *EIA Regulations*

Section 77 of the EMA makes provision for the Minister to make regulations pertaining to any aspect of environmental management. However, no regulations on EIA have been gazetted (SADC, 2012).

3.4.4 *Forestry Act (1997)*

The Act deals with the management of indigenous forests on customary land, private land, forest reserves, protected forest areas, and plantations. The Act aims to (amongst other elements):

- protect trees and resources in forest reserves;
- conserve and enhance biodiversity;
- protect and facilitate management of trees on customary land; and
- promote sustainable utilisation of timber and other forest produce and protect fragile areas such as river banks and water catchment.

Applicability to Project

The Project Site is largely modified by human activities with most of the site being used for the cultivation of crops. There is no land take required from forest reserves, protected forest areas or plantations. However any removal of trees will be in line with the Act.

3.4.5 *Electricity Act, 2004*

The Act ⁽¹⁾ suggests that the developer is required to give no less than 30 days' notice before placing, laying down or carrying any transmission line, or distribution line, water pipeline or other equipment through, over or under any land without the consent of the owner, lessee or occupier of such land. Notice needs to be published in the *Gazette* or in a paper in general circulation. Notices should include the nature of the work and the name and location of the project. Notice will also be provided to the affected person.

It is the responsibility of the authorities to determine the amount of compensation, whether by way of payment of a lump sum or an annual rental, or of both, to such owner, lessee or occupier.

Applicability to Project

The ProjectCo have secured the necessary licenses from ESCOM for the generation of electricity. The requisite notifications will also be made prior to construction commencing.

(1) The Government of Malawi, Electricity Act 2004. Available at <https://www.meramalawi.mw/index.php/legislation/send/2-legislation/5-the-electricity-act-2004> (accessed October 2017)

3.4.6

Energy Regulatory Act No. 20 of 2004

The Act established the Malawi Energy Regulatory Authority (MERA) as a corporate body and as the Energy Sector Wide Regulator. The mandate of MERA is to regulate the energy sector in Malawi in a fair, transparent, efficient and cost effective manner for the benefit of the consumers and operators. In addition, the Authority is mandated to promote renewable energy

Applicability to Project

As the Project will generate electricity from renewable resources and the operations of the Project will be regulated by MERA. The ProjectCo will adhere to all licensing and monitoring requirements.

3.4.7

Water Resources Act (2013)

The Water Resources Act is the major legislation dealing with the control, conservation, apportionment, and use of water resources in the country. The Act also prohibits any person to divert, dam, store, abstract or use public water for any other purpose except in accordance with the provisions of the Act. The Act defines pollution of public water as the discharge into or in the vicinity of public water or in a place where public water is likely to flow, of any matter or substance likely to cause injury whether directly to public health, livestock, animal life, fish, crops orchards or gardens which such water is used or which occasions, or which is likely to occasion, a nuisance.

The activities of the proposed Project will have the potential to pollute surrounding water resources. It is important to note no offence is committed if a discharge is, inter alia, under the authority of the Act or any other written law as under the Water Resources (National Water Resources Authority) Regulations made pursuant to the Act. Permission to discharge into the environment must be sought from the Water Pollution Control Board. Finally, the right to use public water may be limited if the use may cause damage to natural resources of the area or in the vicinity.

Applicability to the Project

The activities of the proposed Project will require water and have the potential to pollute the water resources surrounding the Project Site. It is important to note no offence is committed if a discharge is, inter alia, under the authority of the Act or any other written law as under the Water Resources (Water Pollution Control) Regulations made under the Act. Permission to discharge into the environment must be sought from the Water Pollution Control Board. Finally, the right to use public water may be limited if the use may cause damage to natural resources of the area or in the vicinity.

3.4.8 *Land Act (2016)*

The Act is the principal act with respect to land administration and management in Malawi and for all matters relating to land such as land tenure, land transfer, land use and compensation. The Act vests all land in the Republic in perpetuity. The Act has two categories of land, which are public land and private land. Section 7(2) classifies Public land as Government land and unallocated customary land while Section 7(3) classifies private land as freehold, leasehold or customary estate. ⁽¹⁾

Applicability to Project

The Project is being developed on land that was previously owned by community members in the area. All land related actions will occur in line with the Act.

3.4.9 *Customary Land Act (2016)*

Customary land is the land occupied and used by members of a community who live under customary law. Customary land, however, is not communal land. Most customary land is divided into pieces allocated for the use of individuals and their families. Rights to this land are usually well defined, often for exclusive use and transmissible. ⁽²⁾

3.4.10 *Land Acquisition Act (1970)*

The Lands Acquisition Act sets out in detail, the procedures for acquisition of customary land and freehold land. Any land acquisition should follow the steps as provided for in the existing Lands Acquisition Act. Procedures include steps to be undertaken for government to acquire land starting from issuance of formal notices to persons with existing land interests to payment of compensation for land ownership transfer.

Applicability to Project

The Project is being developed on land that was previously owned by community members in the area. All land acquisition and compensation will occur in line with the Act.

3.4.11 *Land Acquisition Amendment Act (2016)*

The Lands Acquisition (Amendment) Act 2016 empowers the Minister to acquire land in the interest of Malawians.

(1) <http://documents.worldbank.org/curated/en/572641502362203937/pdf/SFG3554-RP-P158805-Box405293B-PUBLIC-Disclosed-8-10-17.pdf>

(2) <http://documents.worldbank.org/curated/en/572641502362203937/pdf/SFG3554-RP-P158805-Box405293B-PUBLIC-Disclosed-8-10-17.pdf>

Applicability to Project

The Project is being developed on land that was previously owned by community members in the area. All land acquisition and compensation will occur in line with the Act.

3.5 LABOUR AND OTHER SOCIAL RESPONSIBILITY LAWS

The Ministry of Labour is mandated to provide policy direction and guidance on all labour administration and vocational training matters. The Ministry is also mandated to protect and develop the labour force in order to contribute to the socio economic development of Malawi. Accordingly, the following Acts apply to the Project.

3.5.1 *The Employment Act (2000) and Labour Relations Act (1996)*

These two Acts regulate employment matters i.e. minimum wage, fair labour practices, non-discrimination, prohibition (in some cases) of employment of children.

Applicability to Project

All Project related employment will be in line with the Employment Act and the Labour Relations Act

3.5.2 *Malawi Bureau of Standards*

The Malawi Bureau of Standards (MBS) is charged with the preparation and promulgation of national standards. Formulation of standards is done through Technical Committees whose membership covers a variety of sectors. Current Technical Committees include one for environmental protection and pollution Control. Malawi is developing its own emissions standards. The standards developed to date by the Malawi Bureau of Standards are as follows:

- 13.020.10: Adoption of the ISO144000 series on environmental management
- MS691:2005: Tolerance limits for domestic sewage effluents discharged into inland surface waters
- MS214:2005: Drinking water – specification
- MS173:2005: Noise pollution – tolerance limits

Applicability to Project

All Project related activities will be in line with the Environmental Standards in Malawi.

3.5.3 *Occupational Safety, Health and Welfare Act (1997)*

The principal legislation that regulates OSH in Malawi is the Occupational Safety, Health and Welfare Act, 1997. The Act regulates conditions of employment in workplaces with regard to safety, health and welfare of employees. The Act imposes duties on employers, self-employed, other persons in control of premises, manufacturers and suppliers (Wage Indicator, 2017).

Applicability to Project

The Project will comply with all occupational health and safety regulations in Malawi. Working conditions on site be monitored to ensure there is no contravention of the Act.

3.5.4 *Public Health Act (1948)*

The Public Health Act is the overarching legislation guiding health legislation in Malawi. The Act is currently under revision.

Applicability to Project

All Project related activities will be in line with the Public Health Act.

3.5.5 *Gender Equality Act (2013)*

The Act seeks to promote gender equality and equal integration of men and women in all functions of society. Prohibiting and providing redress for sex discrimination, harmful practices, sexual harassment and provide public awareness and promotion of gender equality (UNESCO, 2012).

Applicability to Project

ProjectCo will (where possible) promote gender equality in project aspects, particularly through employment and community investment initiatives.

3.5.6 *Marriage, Divorce and Family Relations Act (2015)*

This act consolidates various laws related to marriage including a key provision in terms of recognising the validity of four “same legal status” forms of marriage (civil marriage; customary marriage; religious marriage; and marriage by reputation or permanent cohabitation). Furthermore, this act considers a range of other issues including setting the minimum age for marriage and discussing the rights and duties within marriage.

Applicability to Project

ProjectCo will (where possible) implement measures to ensure community dynamics are not impacted and that issues regarding Gender Based Violence are not exacerbated as a result of the project.

3.6

INTERNATIONAL LENDER STANDARDS AND GUIDELINES

In addition to national legislation, the Project is being developed in line with the standards and guidelines of international finance institutions. These standards and guidelines are intended to complement and reinforce national legislation and ensure the Project is conducted in accordance with international best practice and in a way that minimises risks and impacts.

The Project is considering project finance from international lenders and therefore the Equator Principals (EP) and International Finance Corporation (IFC) Performance Standards (PS) (including the Environmental Health and Safety Guidelines) will have bearing on the project. The applicability of these are discussed in more detail below.

The Equator Principles

The Equator Principles are a set of agreed principles by financial institutions to determine, assess and manage environmental and social risk in project financing. The EPs emphasise that lenders will seek to ensure that the Project is developed in a manner that is socially responsible and reflects sound environmental management practices.

These Principles have been adopted by a wide range of banks and lenders all over the world in order to manage the social and environmental risks associated with their potential investments. The Equator Principles III were adopted in June 2013 and are listed below:

- **Principle 1:** Review and Categorisation;
- **Principle 2:** Environmental and Social Assessment;
- **Principle 3:** Applicable Social and Environmental Standards;
- **Principle 4:** Environmental and Social Management System and Equator Principles Action Plan;
- **Principle 5:** Stakeholder Engagement;
- **Principle 6:** Grievance Mechanism;
- **Principle 7:** Independent Review;
- **Principle 8:** Covenants;
- **Principle 9:** Independent Monitoring and Reporting; and
- **Principle 10:** Reporting and Transparency.

IFC Performance Standards

The IFC applies Performance Standards to manage social and environmental risks and impacts and to enhance development opportunities in the private sector. The IFC PS may be applied by other financial institutions electing to apply them to projects in emerging markets. Together, the eight Performance Standards establish standards that a project is to meet throughout the life of an investment by IFC or other relevant financial institutions. They are as follows:

- **Performance Standard 1:** Assessment and Management of Environmental and Social Risks and Impacts;
- **Performance Standard 2:** Labour and Working Conditions;
- **Performance Standard 3:** Resource Efficiency and Pollution Prevention;
- **Performance Standard 4:** Community Health, Safety and Security;
- **Performance Standard 5:** Land Acquisition and Involuntary Resettlement;
- **Performance Standard 6:** Biodiversity Conservation and Sustainable Management of Living Natural Resources;
- **Performance Standard 7:** Indigenous People; and
- **Performance Standard 8:** Cultural Heritage.

A summary of each PS and an indication of their applicability to the proposed project is provided in *Table 3.1*.

In terms of the categorization of the project in terms of the IFC Policy and Performance Standards on Environmental and Social Sustainability (2012) it is likely that this Project would be categorised as a Category A or B project, more detail on this is provided in the Table below.

Table 3.1 *A summary of the IFC Performance Standards and an indication of their applicability to the proposed project*

Performance Standards	Objectives & Applicability
<p>Performance Standard 1 – Assessment and Management of Environmental and Social Risks and Impacts</p> <p>Underscores the importance of managing social and environmental performance throughout the life of a project (any business activity that is subject to assessment and management).</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • Impact identification and assessment: To identify and assess social and environmental impacts, both adverse and beneficial, in the project’s area of influence. • Mitigation: To avoid, or where avoidance is not possible, minimize, mitigate, or compensate for adverse impacts on workers, affected communities, and the environment. • Stakeholder engagement: To ensure that affected communities are appropriately engaged on issues that could potentially affect them. • Effective management: To promote improved social and environment performance of companies through the effective use of management systems. <p><u>Applicability:</u></p> <p>Due to the scale and the nature of the proposed project PS1 is applicable. The project will require the identification and assessment of impacts, development of mitigation measures, engagement with stakeholders and effective environmental and social management throughout the life of the project.</p>
<p>Performance Standard 2 – Labour and Working Conditions</p> <p>Recognises that the pursuit of economic growth through employment creation and income generation should be balanced with protection for basic rights of workers.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws. • To establish, maintain and improve the worker management relationship. • To promote compliance with national employment and labour laws. • To protect the workforce by addressing child labour and forced labour. • To promote safe and healthy working conditions, and to protect and promote the health of workers. <p><u>Applicability:</u></p> <p>The project will employ labour during the construction and operational phases and thus PS2 is applicable.</p>

Performance Standards	Objectives & Applicability
<p>Performance Standard 3 - Resource Efficiency and Pollution Prevention</p> <p>Recognises that increased industrial activity and urbanisation often generate increased levels of pollution to air, water, and land that may threaten people and the environment at the local, regional, and global level.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> To avoid or minimise adverse impacts on human health and the environment by avoiding or minimising pollution from project activities. To promote more sustainable use of resources, including energy and water. To reduce project -related GHG emissions. <p><u>Applicability:</u></p> <p>PS3 is applicable for due to the following reasons:</p> <ul style="list-style-type: none"> The project will have the potential to cause pollution during construction and through waste management during operations. The project is a renewable energy project and thus is aligned with the objectives of PS3.
<p>Performance Standard 4 - Community Health, Safety and Security</p> <p>Recognises that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> To anticipate and avoid adverse impacts on the health and safety of the Affected Community during the project life from both routine and non-routine circumstances. To ensure that the safeguarding of personnel and property is carried out in accordance with relevant human rights principles and in a manner that avoids or minimises risks to the Affected Communities. <p><u>Applicability:</u></p> <p>PS4 is applicable as the project will have a work force during the construction phase that may impact on the health and safety of the community.</p>
<p>Performance Standard 5 - Land Acquisition and Involuntary Resettlement</p> <p>Outlines that involuntary resettlement refers both to physical displacement (relocation or loss of shelter) and to economic displacement (loss of assets or access to assets that leads to loss of income sources or means of livelihood) as a result of project-related land acquisition</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> To avoid, and when avoidance is not possible, minimise displacement by exploring alternative project designs. To avoid forced eviction. To anticipate and avoid, or where avoidance is not possible, minimise adverse social and economic impacts from land acquisition or restrictions on land use by (i) providing compensation for loss of assets at replacement cost and (ii) ensuring that resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those affected.

Performance Standards	Objectives & Applicability
	<ul style="list-style-type: none"> • To improve, or restore, the livelihoods and standards of living of displaced persons. • To improve living conditions among physically displaced persons through the provision of adequate housing with security of tenure at resettlement sites. <p><u>Applicability:</u></p> <p>The Project site and transmission line wayleave is utilised for farming activities. Land acquisition for the Project will result in economic resettlement and thus PS5 is applicable to the project.</p>
<p>Performance Standard 6 – Biodiversity Conservation and Sustainable Management of Natural Resources</p> <p>Recognises that protecting and conserving biodiversity – the variety of life in all its forms, including genetic, species and ecosystem diversity – and its ability to change and evolve, is fundamental to sustainable development</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To protect and conserve biodiversity. • To maintain the benefits from ecosystem services. • To promote the sustainable management of living natural resources through the adoption of practices that integrated conservation needs and development priorities. <p><u>Applicability:</u></p> <p>PS6 is applicable to the project as the habitats within the Project site are utilised for ecosystem services.</p>
<p>Performance Standard 7 – Indigenous Peoples</p> <p>Recognises that Indigenous Peoples, as social groups with identities that are distinct from dominant groups in national societies, are often among the most marginalised and vulnerable segments of the population.</p>	<p><u>Objectives:</u></p> <ul style="list-style-type: none"> • To ensure that the development process fosters full respect for the dignity, human rights, aspirations, cultures and natural resource-based livelihoods of Indigenous Peoples. • To anticipate and avoid adverse impacts of projects on communities of Indigenous Peoples, or when avoidance is not feasible, to minimise, mitigate, or compensate for such impacts, and to provide opportunities for development benefits, in a culturally appropriate manner. • To promote sustainable development benefits and opportunities for Indigenous Peoples in a culturally appropriate manner. • To establish and maintain an ongoing relationship based on Informed Consultation and Participation (ICP) with the Indigenous Peoples affected by a project throughout the life of the project. • To ensure the Free, Prior and Informed Consent (FPIC) of the Affected Communities of the IPs when the circumstances described in this Performance Standard are present.

Performance Standards	Objectives & Applicability
<p>Performance Standard 8 – Cultural Heritage</p> <p>Recognises the importance of cultural heritage for current and future generations. Consistent with the Convention Concerning the Protection of the World Cultural and Natural Heritage, this Performance Standard aims to ensure that clients protect cultural heritage in the course of their project activities.</p>	<ul style="list-style-type: none"> • To respect and preserve the culture, knowledge and practices of Indigenous Peoples. <p><u>Applicability:</u></p> <p>As there are no indigenous peoples affected by the proposed project PS7 is not applicable.</p> <p><u>Objectives:</u></p> <ul style="list-style-type: none"> • PS 8 aims to protect the irreplaceable cultural heritage and to guide clients on protecting cultural heritage in the course of their business operations. In addition, the requirements of this PS on a project’s use of cultural heritage are based in part on standards set by the Convention on Biological Diversity. PS 8 recognises the importance of cultural heritage with an objective to: • Protect cultural heritage from the adverse impacts of project activities and support its preservation; and • Promote the equitable sharing of benefits from the use of cultural heritage in business activities. • The PS requires the Project Proponent to comply with relevant national law on the protection of cultural heritage, including national law implementing the host country’s obligations under the Convention Concerning the Protection of the World Cultural and Natural Heritage and other relevant international law. <p><u>Applicability:</u></p> <p>No cultural heritage sites have been identified on the Project site.</p>

IFC Environmental, Health and Safety Guidelines

The Environmental, Health and Safety (EHS) Guidelines are technical reference documents that address IFC's expectation regarding the industrial pollution management performance of projects. This information supports actions aimed at avoiding, minimising, and controlling EHS impacts during the construction, operation, and decommissioning phase of a project or facility.

In the context of the proposed project, the most relevant EHS Guidelines to be considered are:

- World Bank Group General EHS Guidelines (2007); and
- World Bank Group EHS Guidelines for Electric Power Transmission and Distribution (2007).

Note that guidelines on solar PV plant development are currently not available.

In terms of the IFC Performance Standards, this would be categorised as a Category A or B project, requiring a full ESIA.

3.6.2 *International Conventions*

Malawi has concluded or ratified a number of international conventions and agreements relating to industry, development and environmental management. In certain cases, conventions and agreements have influenced policy, guidelines and regulations and therefore are relevant to planning, construction and operation of the Project.

Table 3.2 lists the relevant international conventions and protocols to which Malawi has either ratified or concluded relevant to the Project. Many of these are incorporated into the various World Bank Operational Procedures and the IFC Performance Standards. By conforming to these two sets of standards, the Project will comply with the requirements of the relevant international conventions.

Table 3.2 *International Convention and Agreements Concluded or Ratified by Malawi*

Year	Name of the Convention / Agreement
2003	The Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention)
2001	The International Labour Organisation (ILO) Fundamental Convention related to forced labour, freedom of association, discrimination and child labour
2000	International Covenant on Economic, Social and Cultural Rights
2000	International Covenant on Civil and Political Rights
1992	United Nations Framework Convention on Climate Change (UNFCCC)
1992	Convention on Biological Diversity (CBD)
1989	African Charter on Human and People's Rights
1989	Montreal Protocol on Substances that deplete the Ozone Layer
1985	Vienna Convention for the Protection of the Ozone Layer
1983	United Nation Convention on the Law of the Sea (UNCLOS), Montego Bay, Jamaica
1975	Convention Concerning the Protection of the World Cultural and Natural Heritage (World Heritage Convention), Paris
1971	Ramsar Convention on Wetlands of International Importance, especially Waterfowl Habitats (Ramsar, Iran)
1968	African Convention on Conservation of Nature and Natural Resources

4.1 IMPACT METHODOLOGY

The impact assessment (IA) methodology follows the overall approach illustrated in *Figure 4.1* and a full description of the methodology is included in *Annex B*.

4.2 OUTCOME OF SCOPING

The scope of the assessment falls under three broad categories:

- Spatial scope (the potential Area of Influence (AoI) as defined in *Section 4.3*);
- Temporal scope (the time periods over which the impacts may be experienced as described in *Section 4.4*); and
- Technical scope (the Project activities and how they interact with potentially relevant environmental and social resources and receptors as described in *Section 4.5*).

Potential environmental and social issues have been evaluated as part of the scoping exercise in order to determine whether they are likely to give rise to significant impacts and, therefore, the extent to which they should be included in this ESIA. Based on an understanding of the design and location of the Project and the local and regional environmental issues that are likely to be relevant, ERM has identified and reviewed those issues that may be material considerations. These have been 'scoped in' to this ESIA and will form the technical scope of this ESIA. Some impacts have been 'scoped out' of the ESIA and will not be investigated further.

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT METHODOLOGY

Impact Assessment Process

1. Identify Impact

The scoping process identifies the potentially most important/significant impacts and effects for the assessment to address. This is done through a combination of:

- looking at the nature of the project activities and the impacts they will give rise to;
- looking at the project's environmental and social setting and its aspects which are likely to be most sensitive/vulnerable to impacts from the project;
- applying professional understanding gained from the evidence base; and
- considering inputs from stakeholders through consultation.

Decisions are then made on which impacts and effects to assess or to prioritise in the assessment (scoping in and scoping out) and how to assess them (proposed methodology).

2. Predict Magnitude

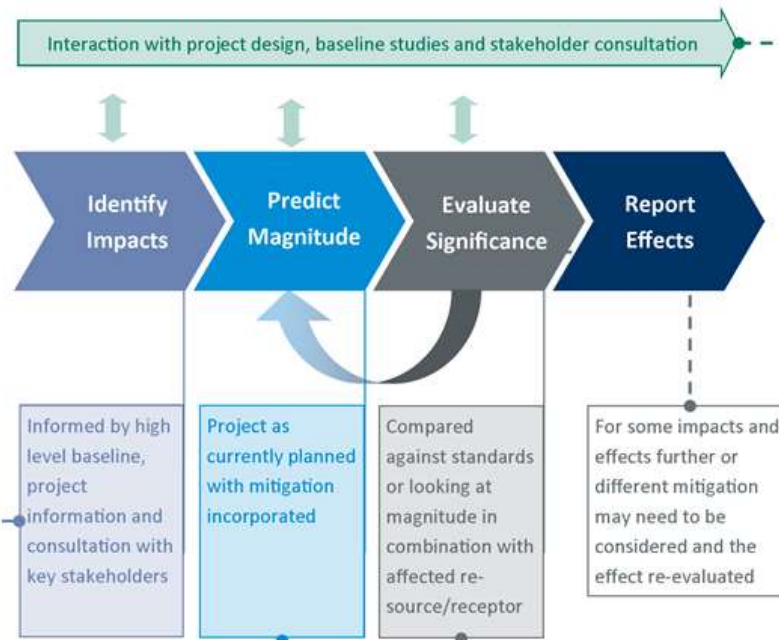
The project's impacts are quantified in terms of, for example:

- change in noise levels at a residence;
- level of interaction of Project construction and operational vessels with shipping and navigation and other marine users;
- dust and PM₁₀ exposure to nearby sensitive receptors including residents, tourists at the cruise terminal and nearby schools; and
- numbers of jobs generated in the local economy.

In predicting magnitude the effect of all the project mitigation in place is taken into account. For some impacts, especially noise and air pollution, significance can be assessed directly against numerical criteria and standards. For exceedances further mitigation must be incorporated by the Project to reduce the magnitude of the impact (and significance of its effect).

For other impacts nominal levels of magnitude (eg small, medium, large) may be adopted based on widely recognised factors such as: the nature of a change (what is affected and how); its size, scale or intensity; its geographical extent and distribution; its duration, frequency, reversibility.

Some activities will result in changes to the environment that may be immeasurable or undetectable or within the range of normal natural variation. Such changes will be assessed as having no impact or to be of negligible magnitude and will not lead to significant effects.



Describe Baseline

Baseline data are collected to better understand the potentially most important impacts and effects identified in scoping. Baseline data may quantify existing exposure levels (e.g. for noise and air pollution), identify sensitive receptors such as residents, nearby schools and aquatic species.

Where a baseline aspect can not be quantified then nominal levels of importance, quality of value (low, medium, high) are assigned based on widely accepted criteria in fields such as ecology, cultural heritage, landscape and socioeconomic impact. Levels of sensitivity may be assigned in a similar way, but noting that sensitivity is a characteristic linked to how a receptor responds to an impact (and the magnitude of that impact). For example, avifauna may be of high importance (protected), highly sensitive to loss of habitat and food sources, moderately sensitive to construction noise and of low sensitivity to traffic movements.

3. Evaluate Significance

In evaluating significance, the EIA process is seeking to inform regulators and stakeholders about the effects of the Project in a way that helps them make decisions on whether to approve and allows them to develop suitable conditions to attach to an approval. The evaluation of significance should ideally demonstrate legal compliance at least (eg compliance with quantified standards, avoidance of effects on legally protected resources).

In the absence of quantified standards, impacts/effects can be evaluated through considering the magnitude of an impact in combination with the importance/quality/value (and sometimes sensitivity) of the receptor or resource that is affected. Moderate or major impacts/effects may warrant re-examination to see if an impact magnitude can be reduced further. Different mitigation options may be examined and the reasons for selecting one and rejecting others explained. Some impacts/effects that cannot be adequately mitigated may need to be addressed through the consideration of offsets or compensation. The evaluation process may go through more than one iteration of working with project design to develop suitable mitigation and re-evaluating impacts and effects.

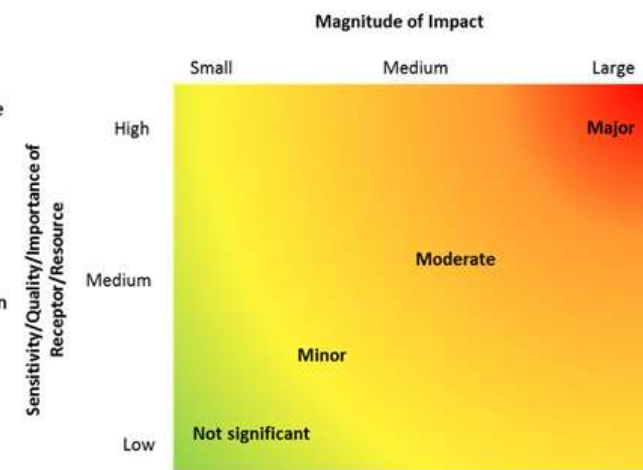


Figure 4.1 Impact Assessment Process (Source, ERM 2012)

4.3 SPATIAL SCOPE (AREA OF INFLUENCE)

For the purposes of this impact assessment, the definition of the AoI given in the Performance Standards is used. The AoI encompasses:

- *'The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.*
- *Associated facilities are facilities that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.*
- *Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.'*

A description and map illustrating the extent the AoI is included in *Chapter 5*.

4.4 TEMPORAL SCOPE OF THE ESIA

The temporal scope of the assessment generally refers to the time periods over which impacts may be experienced. This will be established for each Project component and environmental and social topics, where appropriate through discussion with the relevant statutory consultees. In general, the following terms will be used:

short-term – the impact is temporary and lasts for up to 12 months

medium-term – the impact occurs for up to 5 years

long-term – the impact remains for a substantial time, perhaps permanently.

The phases to be assessed in the ESIA are those set out in *Chapter 2* of this report, namely:

- site preparation and construction;
- operation; and
- decommissioning.

4.5 TECHNICAL SCOPE OF THE ESIA

The range of environmental and social topics to be addressed in the ESIA is generally referred to as the technical scope. An assessment has been undertaken by specialists for each of the environmental and social topics that

have been scoped in for the ESIA. The environmental and social issues that comprise the technical scope of the ESIA and the reasons for their inclusion are set out in *Figure 4.2*).

Note decommissioning impacts have been assumed to be comparable to construction phase impacts.

Technical Scope						
Topic	Phase	Potential source of impact	Scoped in	Scoped out	Potential affected receptors	Actions Required to Assess potential impacts
Air quality	Construction	Road traffic (dust)	✓		Human health. (Note: all air quality impacts to ecology receptors have been scoped out.)	Semi-qualitative assessment of potential impacts from construction dust on human health to be included in the ESIA.
	Construction	Earthworks	✓			
	All phases	Road traffic (combustion)		✓		
Noise	All phases	Road traffic		✓	Neighbouring villages	Semi- quantitative assessment of construction noise impacts to be undertaken in ESIA.
	Construction	Earthworks and construction of solar plant	✓			
Ecology	Operation	Solar plant operation and maintenance		✓	Flora and fauna (Note: no critical habitat present)	Undertake ecological/terrestrial baseline survey to produce a habitat map and species mapping to understand whether are any locally, nationally or internationally important species.
	Construction	Site clearance and construction of solar plant	✓			
Water Use	Construction	Site clearance and construction of solar plant (assuming no water use for dust suppression)	✓		Neighbouring villages	Geotechnical and hydrology surveys (outside of ESIA scope) have been commissioned to determine water table and potential water availability . Impact assessment based on this information will be included in the ESIA
	Operation	PV cell cleaning	✓			
Cultural heritage	Construction	Site clearance and earthworks	✓		Neighbouring villages (to be determined)	Map and characterise intangible and tangible sites of importance for cultural heritage through field work and consultation. Develop a chance find procedures for the protection or preservation of cultural sites identified during construction.
Economy and Livelihoods	Construction	Employment and procurement of goods and services	✓		Neighbouring villages and wider district/ regional/national economy	Assess the livelihoods, income sources and commercial activities in the Project Area to determine the possibility for supplying goods and services. Include livelihood restoration measures in the RAP/LRP
Land Tenure and Use	Construction	Primarily land take , and potentially removal of some structures (to be determined)	✓		Land users and community members	Identify project affected people with the support of relevant Group Village/Village Headmen and the District Office. Confirm the land uses in impacted areas.
Community Health and Safety	All phases	Community/workforce interactions (primarily for construction)	✓		Neighbouring villages	Assess the construction impacts of project activities of surrounding communities
Community Cohesion / Population Change	All phases	Land take, and in-migration of job seekers and the construction workforce	✓		Neighbouring villages	Assess the construction impacts on current social networks, traditional structures, social cohesion, security, and economic welfare
Public Infrastructure and Services	All phases	Project use of local/regional services (Primarily for construction), as well as pressure from in-migration	✓		Local/district services	Assess the construction impacts on public infrastructure including roads, clinics, schools and waste services. Ensure communication with existing communities.
Labour and Working Conditions / Occupational Health and Safety	All phases	Presence of a workforce (Primarily for construction)	✓		Workforce	Compare and update (if necessary) Project policies they are in line with Malawian regulations and international best practices.
Waste	All phases	Waste disposal and management	✓		Infrastructure (waste disposal sites), soil and groundwater near sites	The potential for disposal site facilities for the Project will be determined for hazardous and non-hazardous waste. Preparation of a Waste Management Plan for construction and operational activities.
Climate Change	All phases	Greenhouse gas generating activities (Scoped out as operational emissions will be below 25000 tonnes CO ₂ e per year.)		✓	N/A	The Project will only result in temporary emissions during construction
Visual amenity	Operation	Presence of site	✓		Neighbouring villages	High-level landscape and visual amenity assessment, identification of any visual sensitive receptors, if any
Ecosystem Service	All phases	Project activities (Livelihood and resource use captured under other topic areas.)	✓		N/A	Ecosystem services assessment to be included in the ESIA.
Traffic	All phases	Project activities	✓		N/A	Qualitative traffic assessment to be included in the ESIA.

Figure 4.2 Technical Scope of the ESIA

The objective of the environmental baseline is to establish the characteristics of the existing biophysical conditions in the Project area. This Chapter presents the baseline conditions in the Project area and serves as the reference point against which changes can be predicted and ultimately monitored.

5.1 AREA OF INFLUENCE

The baseline section presents an overview of the biophysical and socioeconomic characteristics relating to the area in which the development will take place (i.e. within the Project 'footprint') as well as the surrounding areas which may be directly or indirectly affected by the proposed Project. This Area of Influence (AoI) includes the Project sites (land for the solar PV power plant site and transmission line), access roads to the site, the area surrounding the site potentially affected by the Project, and nearby communities.

The IFC Performance Standards require project proponents to identify and manage environmental and social risks and impacts within their Area of Influence (AoI). The AoI is defined in IFC Performance Standard 1 as:

The area likely to be affected by: (i) the project and the client's activities and facilities that are directly owned, operated or managed (including by contractors) and that are a component of the project; (ii) impacts from unplanned but predictable developments caused by the project that may occur later or at a different location; or (iii) indirect project impacts on biodiversity or on ecosystem services upon which Affected Communities' livelihoods are dependent.

Associated facilities, which are facilities that are not funded as part of the project and that would not have been constructed or expanded if the project did not exist and without which the project would not be viable.

Cumulative impacts that result from the incremental impact, on areas or resources used or directly impacted by the project, from other existing, planned or reasonably defined developments at the time the risks and impacts identification process is conducted.

5.1.1 Direct Area of Influence

In the context of this report, the Direct Area of Influence (DAoI) includes the Project footprint as well as the receiving environment surrounding the site. This encompasses the 12 ha Project site, transmission line route and wayleave, and the surrounding communities likely to be affected by the Project activities during construction, operation, and decommissioning phases.

More specifically, the direct area of influence includes households and communities that may be directly and indirectly impacted by the Project during construction, operation and decommissioning. This includes villages that are impacted by land acquisition and that reside or use land within;

- 500 meters around the solar PV site; and
- 500 meters either side of the centreline at the northern end of the transmission line, extending to 1 km on the western side, to capture the main road, and 500 meters on the eastern side from the centre of the transmission line. This will also act as a buffer for land required for the substation.

This also includes villages that will be impacted by the construction of access roads, health and safety impacts (including disturbance from noise and dust during construction), worker camps and in-migration of job opportunists into the local area. A map of the DAoI is included in *Figure 5.1*.

5.1.2 *Indirect Area of Influence*

The Indirect Area of Influence (IAoI) includes areas within a wider radius of the Project site, which may be affected by the Project although to a lesser extent. In the context of this Project, villages along and users of the site access road and environment immediately surrounding the DAoI.

The IAoI and DAoI are collectively referred to as the Project area.

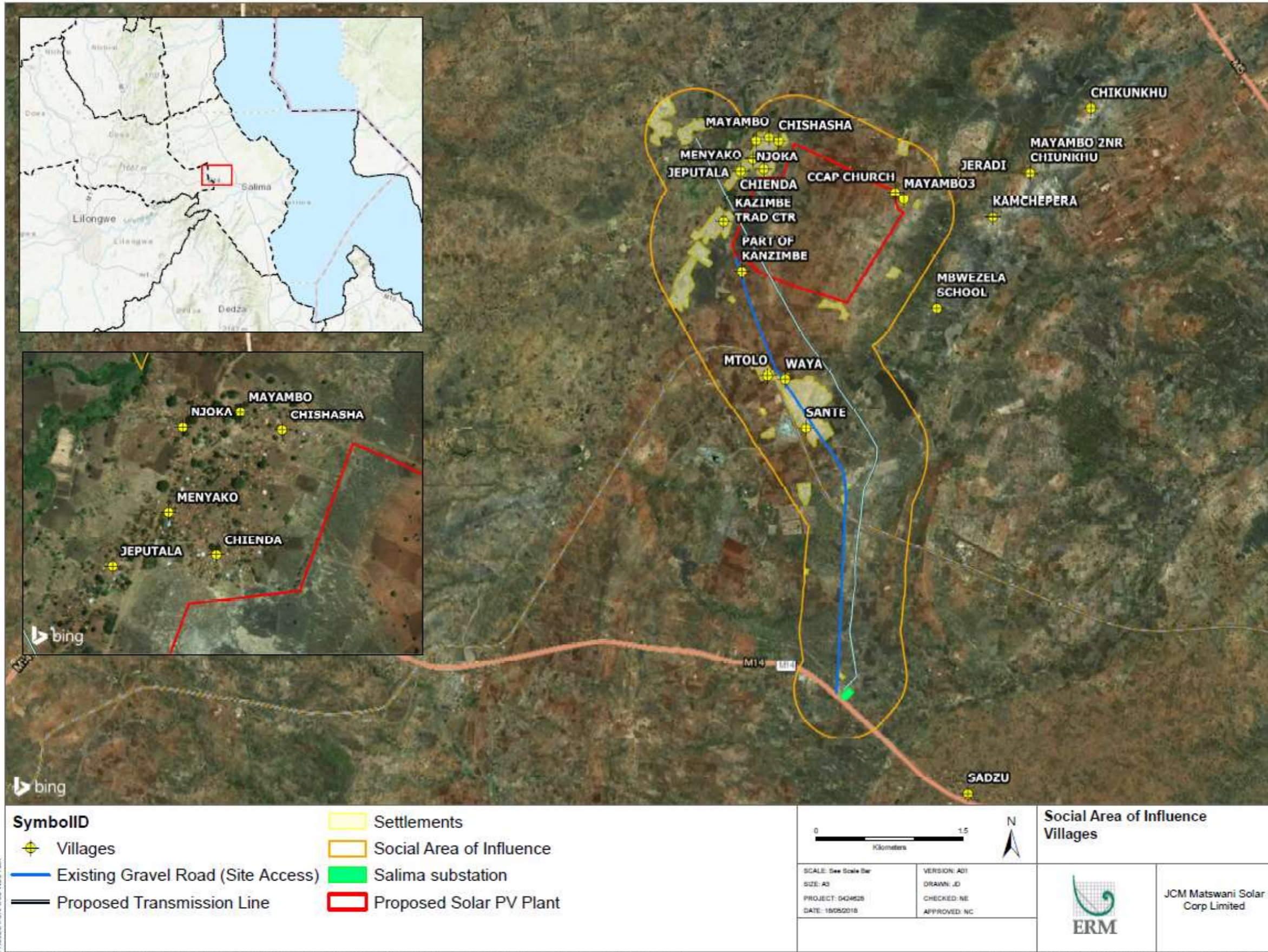


Figure 5.1 Map of the Direct Area of Influence (Source ERM, 2018)

5.2

PHYSICAL BASELINE

This section describes the physical environment of the Project area. The information in this section is based on a desktop review of publicly available information, and specialist on-site studies.

5.2.1

Climate and Meteorology

Malawi has a sub-tropical climate, which is relatively dry and strongly seasonal. The warm-wet season stretches from November to April, during which 95% of the annual precipitation takes place ⁽¹⁾. Annual average rainfall varies from 725mm to 2,500mm. The low-lying areas such as Lower Shire Valley and some localities in Salima and Karonga are more vulnerable to floods than higher grounds ⁽²⁾.

A cool, dry winter season is evident from May to August with mean temperatures varying between 17 and 27 degrees Celsius, with temperatures falling between 4 and 10 degrees Celsius. A hot, dry season lasts from September to October with average temperatures varying between 25 and 37 degrees Celsius ⁽³⁾. *Figure 5.2* illustrates the average temperature and rainfall for Malawi. Salima has an average minimum temperature of between 18-20 degrees Celsius and average maximum temperature of 28-30 degrees Celsius. In addition, *Figure 5.3* illustrates the rainfall map for Malawi with Salima receiving on average 1201-1400 mm of rainfall per year.

(1) Department of Climate Change and Meteorology Services (2006), Temperature maps, accessed at: <https://www.metmalawi.com/climate/temperature.php>

(2) Department of Climate Change and Meteorology Services (2006), Temperature maps, accessed at: <https://www.metmalawi.com/climate/temperature.php>

(3) Department of Climate Change and Meteorology Services (2006), Climate, accessed at: <https://www.metmalawi.com/climate/temperature.php>

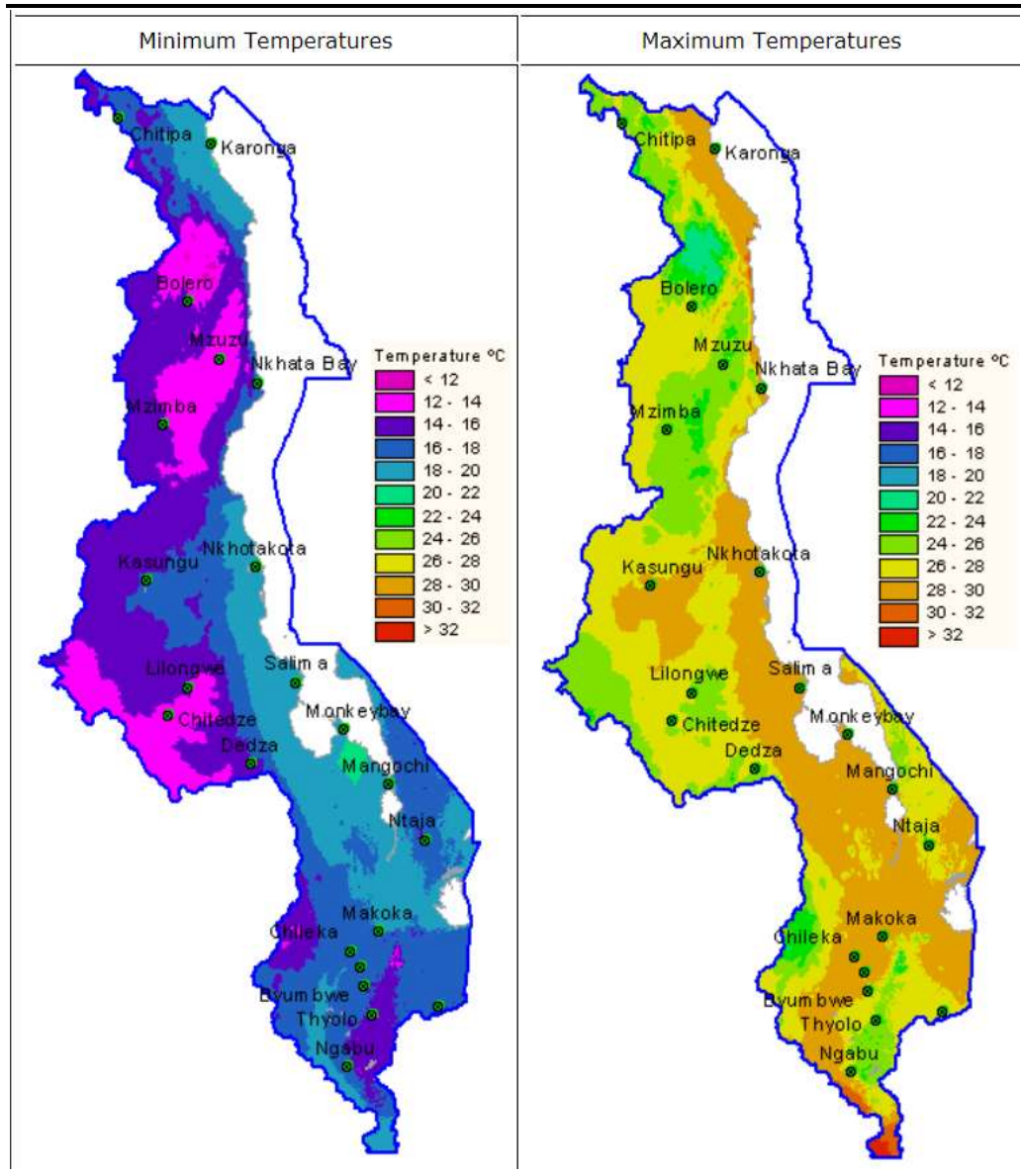


Figure 5.2 Annual Temperature for Malawi (Source Department of Climate Change and Meteorology, 2006)

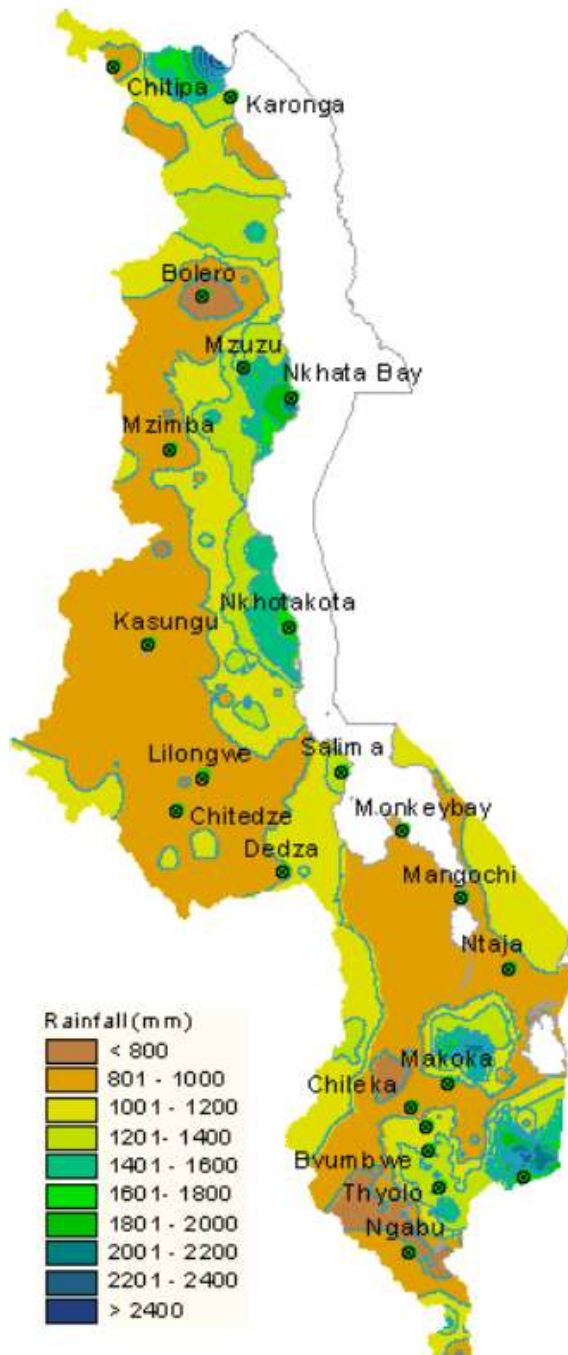


Figure 5.3 *Annual Rainfall Map for Malawi (Source Department of Climate Change and Meteorology, 2006)*

5.2.2 *Topography, Drainage and Land Use*

Lake Malawi is situated approximately 29 km east of the Project Site. The Lilongwe River is located approximately 7 km south of the Project site and the Namanda River is 500 m to the east. The western portion of the Project site is periodically waterlogged in the wet season (*Figure 5.7*).

Figure 5.4 illustrates the remaining drainage lines on the Project site. The drainage of the site moves generally in a north and north easterly direction in line with the topography of the Project site.

Figure 5.1 illustrates a site elevation map for the Project Area. The majority of the Project site falls within the contour 560-580m elevation illustrating that site topography is predominantly flat.

The Project site is predominantly used for agricultural purposes. Crops cultivated in the area include maize, groundnuts, beans, soya and tobacco among others. Trees on the Site include natural and planted, and fruit trees such as mango trees which are harvested for commercial purposes. Within the Project area, residents also rear livestock like cattle, goat and pigs.

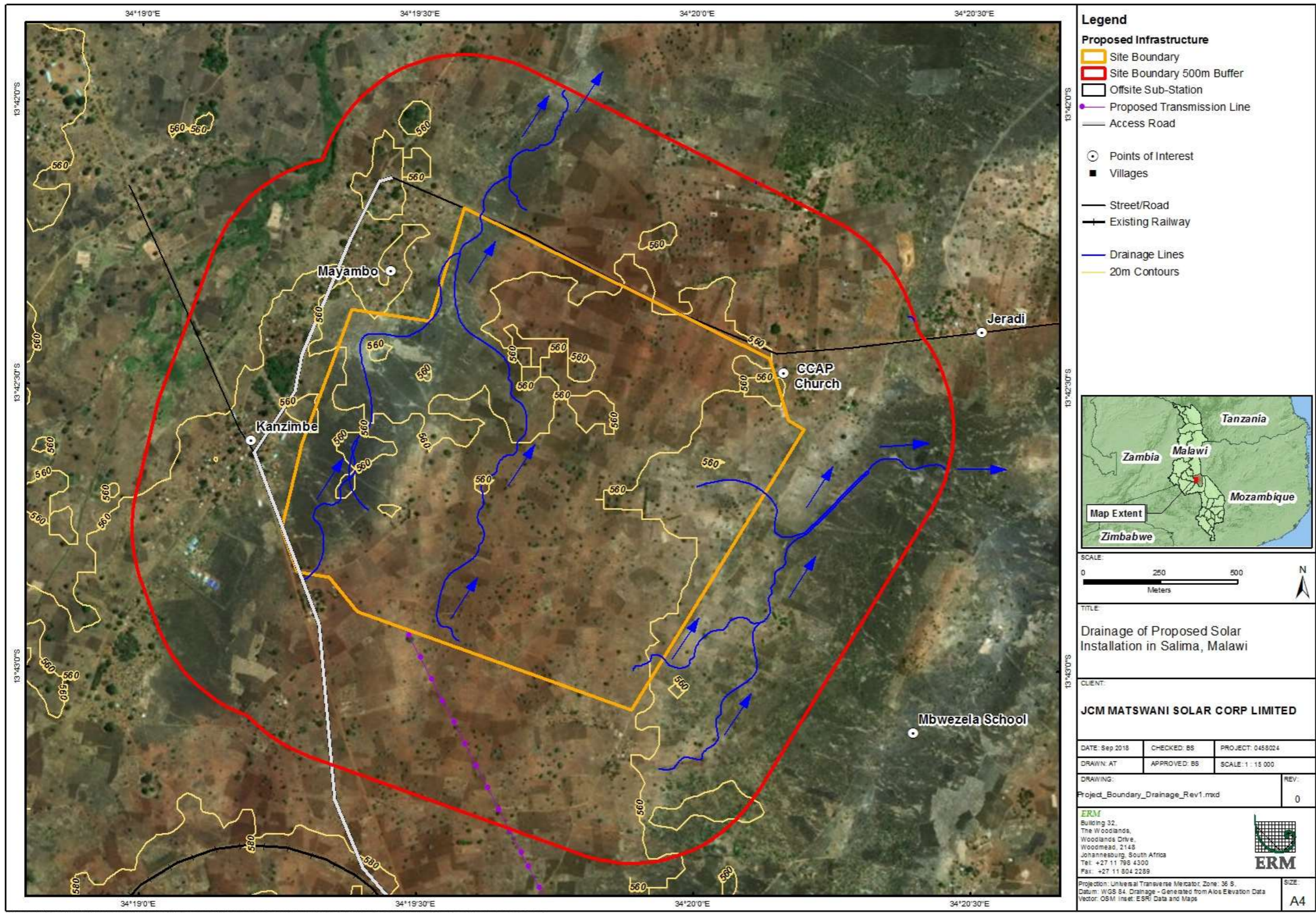


Figure 5.4 Drainage lines within the Project Site

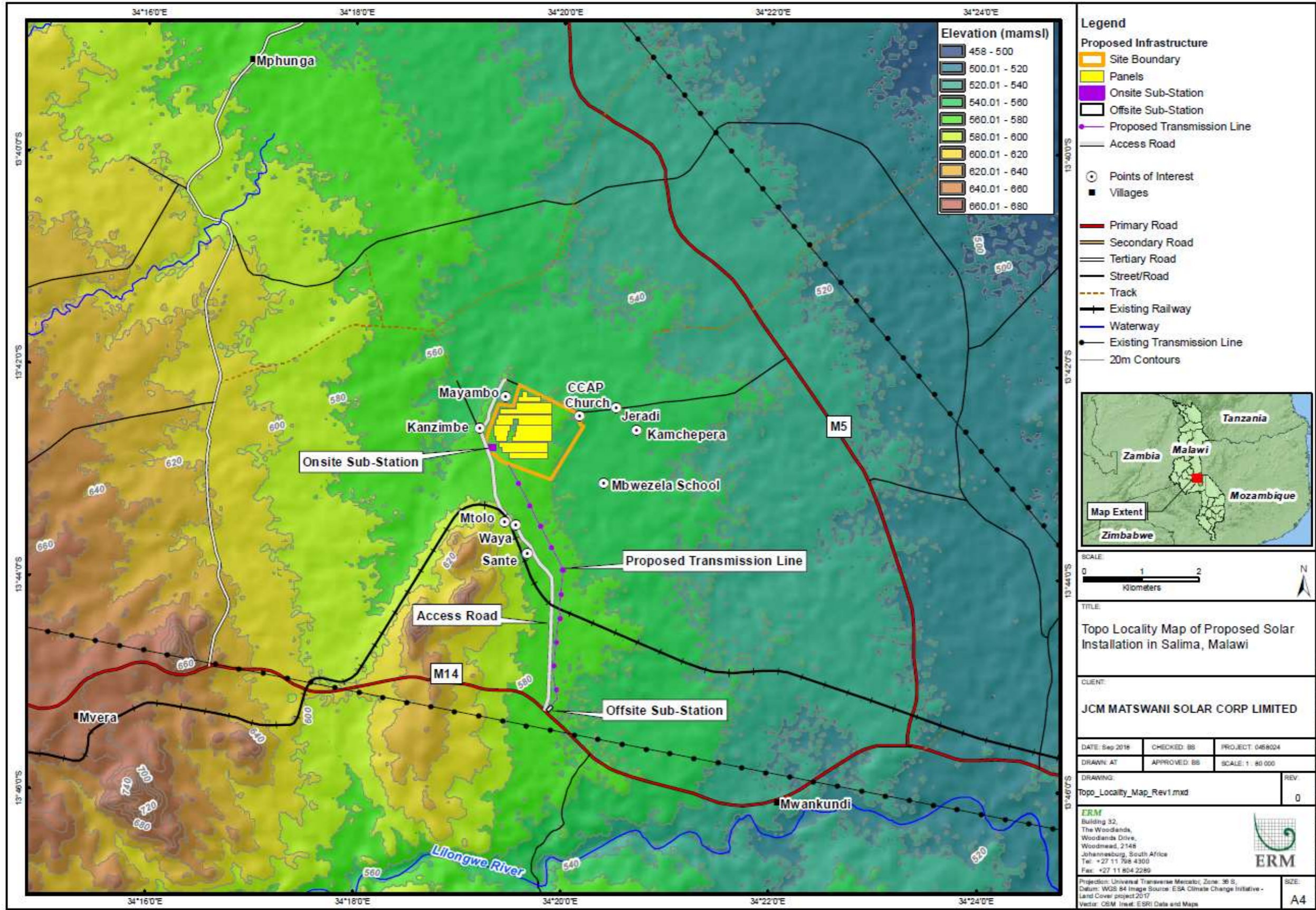


Figure 5.5 Elevation Map of the Project Area

5.2.3

Air Quality and Noise

In rural areas indoor air quality is likely to be poor, with rural homes cooking almost exclusively with wood resulting in exposure to elevated respirable particulate matter (PM₁₀ and PM_{2.5}) ⁽¹⁾. However, in rural areas outdoor air quality is not expected to be degraded and air quality is typically affected by dust from roads and periodic burning of land.

There are no notable point source emissions to air in the Project area and there are no major urban or industrial activities near the Project site.

In addition, there are no notable point source noise emissions. The Project site is surrounded by agriculture and there are no major industrial or urban centres near the Project site.

5.2.4

Geology and Soils

Geology

The Project site is underlain by a charnockitic suite which has been subjected to gneissic foliation. It specifically consists of banded pyroxene-granulites, gneisses and hypersthene granite ⁽²⁾. The rocks have been affected by orogenic episodes comprising the Ubendian, Irumide and the Mozambican cycles. Only the latter cycle influenced the area where most of the Basement Complex became regionally metamorphosed and migmatized to a greater or lesser extent. Plastic deformation was common and large areas of biotite and hornblende gneisses, charnockitic granulites and gneisses were produced. The latter are expected on the site.

(1) DG Fullerton, S Semple, F Kalambo, A Suseno, R Malamba, G Henderson, JG Ayres and SB Gordon, Biomass fuel use and indoor air pollution in homes in Malawi, *Occupational and Environmental Medicine*, 2009, 66 (11): 777 - 783.

(2) Aurecon (2018), Geohydrological Survey, Pretoria

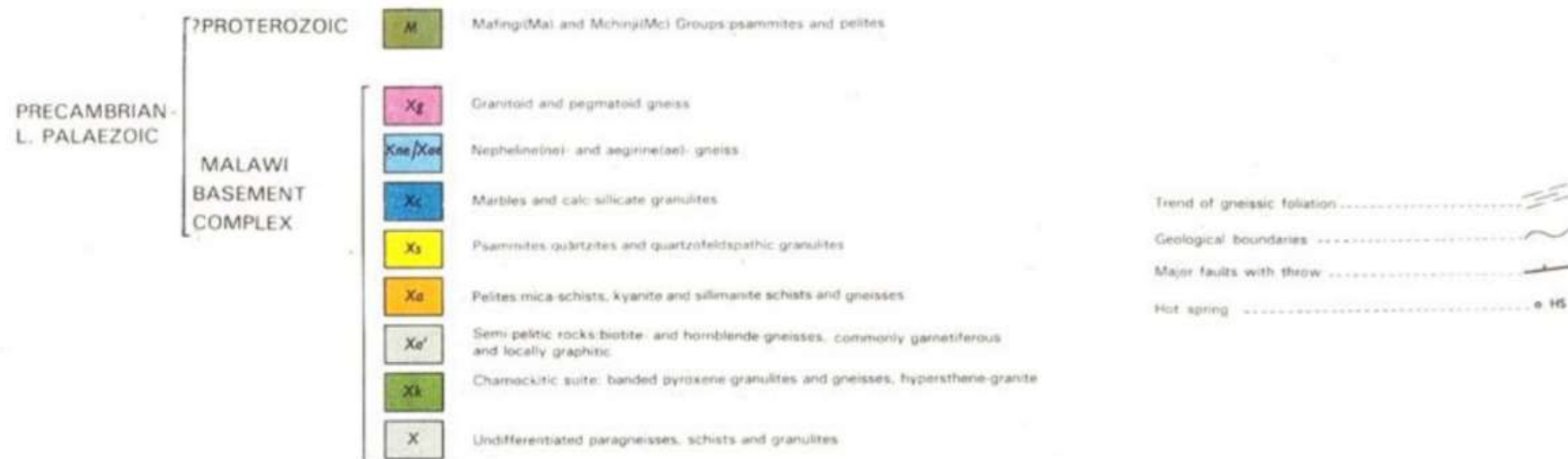


Figure 5.6 Geology of the Project Site (Source Aurecon, 2018)

Soils

A total of 15 test pits were excavated on the Project site in February 2018 to log the soil properties. Based on these results, the proposed Project site can be divided into three Zones; Zone 1, Zone 2 and Zone 3 (Figure 5.8). The data on soils and geology is derived from the Aurecon Geotechnical Report ⁽¹⁾ (Annex C).

Zone One

Zone One comprises of a 0.3 m thick top soil which is very moist, dark grey brown and soft in texture. It is also characteristic of sandy clay with roots. The top soil layer is underlain by an approximately 0.9 m thick transported layer, which is also moist, grey brown in colour and has a soft to firm texture with sandy clay. Below the transported horizon is the gneiss layer which is described as moist, grey-brown speckled white in colour and stiff to very stiff in texture. It is also intact and is characteristic of sandy clay with gravel and pebbles.

Zone One lies on the western section of the proposed Project site dominated by the clay layer. This zone was the most difficult to access due to the impermeable clay layer (Figure 5.7)



Figure 5.7 *Impermeable Clay Layer in Zone One (Source Aurecon, 2018)*

*Photo taken on 6 February 2018

(1) Aurecon (2018), Geotechnical Survey, Pretoria

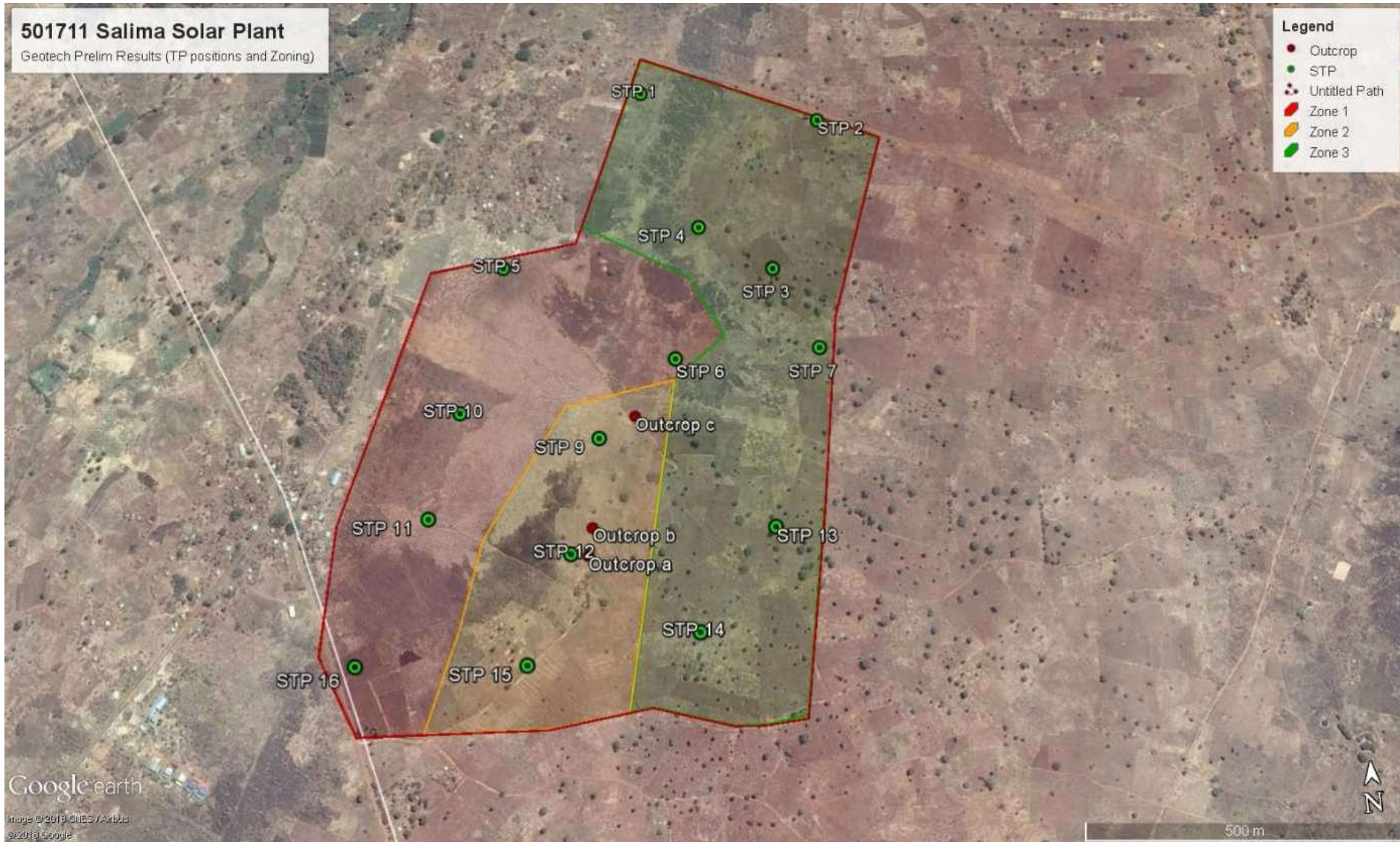


Figure 5.8 The Proposed Project Site is Classified into Three Zones Source: Aurecon (2018)

Zone Two

Zone Two is comprised of a 0.3 m thick topsoil layer which is very moist, dark brown and loose. It has silty sand with roots. This layer is underlain by a transported layer which is attributed by moist, brown, loose to medium, clayey sand. Below the transported horizon lies the residual gneiss layer which is moist, grey/brown speckled white in colour, stiff to very stiff in texture, intact and has sandy clay with ferruginous gravels. This layer is underlain by a pedogenic layer of hardpan ferricrete with a very dense overall consistency. Hard rock gneiss outcrop (*Figure 5.9*) was noted on this zone.



Figure 5.9 *Rocky Outcrop in Zone Two (Source Aurecon, 2018)*

Zone Three

Zone Three is typical of a 0.3 m thick topsoil layer which is described as very moist, dark grey brown, soft and sandy with clay roots. This layer is underlain by an approximately 0.9 m thick transported layer which is described as very moist, grey brown in colour, firm to stiff in texture with sandy clay. Below the transported horizon lies the residual layer, which is described as moist, grey brown speckled white, stiff to very stiff, intact and has sandy clay with gravel. At the bottom of the test pits is a completely weathered granite gneiss which was excavated as sandy gravel material. The Zone Three test pit is illustrated in *Figure 5.10* below.



Figure 5.10 *Test Pit Profile in Zone Three (Source Aurecon, 2018)*

5.2.5 *Groundwater*

Information in the section was derived from the Aurecon Geo-hydrological Report produced for the ProjectCo in February 2018. The full Report is in *Annex C*.

Groundwater Level

Aquifers within the occurring geology consist of secondary fractured aquifers and groundwater occurrence in these mainly charnockitic rocks is generally associated with zones of weathering, and the contact between the weathered and fresh materials ⁽¹⁾. Groundwater is commonly first struck near the base of the clays, and usually rises (sometimes by several metres) before static water

(1) Chilton et al (1983), Groundwater Resources of Malawi. Overseas Development Administration Institute of Geological Sciences.

level is found. The saturated thickness of the aquifer will be a critical factor in determining whether sufficient yields can be supplied, even for rural domestic supplies for hand pumps. Where the weathered zone is too thin, or the depth to water is too great (even where there is a deep weathered zone), potential yields are likely to be insufficient. Another important factor is the permeability of the saprolite; even if there appears to be a sufficient saturated thickness of weathered material, a very clay-rich sequence may result in very low permeability and inadequate borehole yields ⁽¹⁾.

In the weathered basement aquifers, groundwater is usually struck at a level below the static water level, and it then rises, sometimes by several metres. This is evidence of the semi-confining nature of the surface strata. The extent of the rise in water level reflects the degree of artesian pressure and depends on many factors including the lithology, the topographic position. The depth to groundwater rest level is generally less than 25 m and commonly less than 15 m below surface ⁽²⁾.

Groundwater Yield

Groundwater resources are widespread throughout the country. Their occurrence is associated with two types of aquifers ⁽³⁾:

- The extensive, but relatively low yielding weathered Precambrian basement gneiss complex formations, which accounts for about 85 percent of the country's geology, and
- The relatively high yielding quaternary alluvial deposits occurring in the Lakeshore Plains.

According to the BGS Report (IR/10/103) ⁽⁴⁾, a successful borehole in this fractured aquifer has a potential yield of between 1800 and 7200 l/h. Chilton et al, 1983, reported that in the weathered basement aquifer, yields are generally higher where the saturated thickness of the weathered zone is greatest and the bedrock coarsest. The higher yields are likely to occur where the weathered zone is associated with fractures which commonly allows greater depths of weathering. These zones can sometimes be picked out as lineations on aerial photos.

Groundwater resources within the region of the project site are associated with the weathered zone above fractured bedrock. The aquifer thicknesses are commonly 10 to 25 m. The aquifer is partly confined by an overlying thickness of 5 to 20 m of tightly compacted clays and soils which have very

(1) Chilton et al (1983), Groundwater Resources of Malawi. Overseas Development Administration Institute of Geological Sciences.

(2) Chilton et al (1983), Groundwater Resources of Malawi. Overseas Development Administration Institute of Geological Sciences.

(3) Halle, B and J. Burgess (2006), Country Environmental Profile for Malawi, AGRIFOR Consult, Belgium media/Publications/ groundwater-quality-information-malawi.

(4) British Geological Survey (2004) Groundwater Quality: Malawi, WaterAid

low permeability (Figure 5.11). Where groundwater is encountered it is commonly near the base of the clays and under pressure, indicating that it is held within a confined aquifer. The fresh bedrock underlying the weathered zone is rarely a significant aquifer, except where it is extensively fractured⁽¹⁾. Hydrogeological parameters for the typical weathered basement aquifer are presented in Table 5.1.

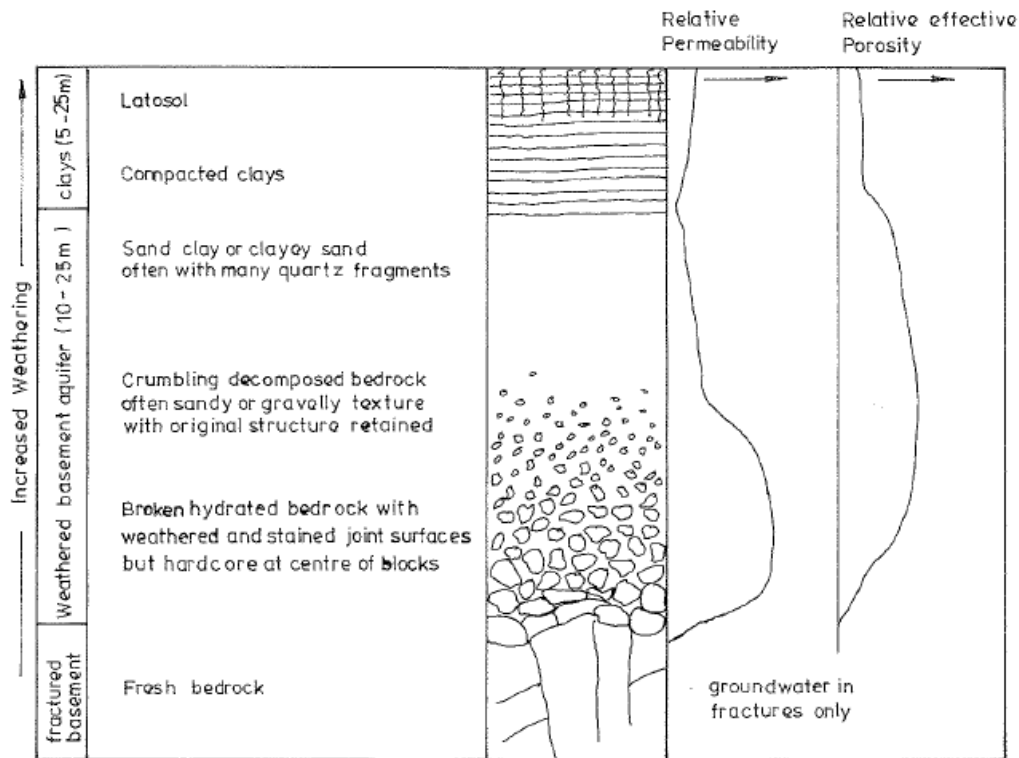


Figure 5.11 Typical Profile of Weathered Basement Aquifer (Source: Smith-Carrington, A.K., and Chilton, P.J., 1983)

Table 5.1 Characteristics of the Weathered Basement Complex Aquifers

Parameter (units)	Value range
Borehole yield (l/s)	1 - 2
Hydraulic conductivity (m/d)	0.5 - 1.5
Depth of boreholes (m)	45 - 50
Depth of water table (m)	15 - 25
Transmissivity (m ² /d)	5 - 35
Storage coefficient (-)	1x10 ⁻² - 5x10 ⁻³

Source: Ministry of Irrigation and Water Development (2006) in Pavelic, P.; Giordano, M.; Keraita, B.; Ramesh, V; Rao, T. (Eds.). 2012. Groundwater availability and use in Sub-Saharan Africa: A review of 15 countries. Colombo, Sri Lanka: International Water Management Institute (IWMI). 274 p.

(1) Chilton et al (1983), Groundwater Resources of Malawi. Overseas Development Administration Institute of Geological Sciences.

Rural areas in Malawi are highly dependent on groundwater to support their livelihoods. Areas which experience a low stream density groundwater supply play a leading role in terms of servicing the community domestic needs as well as agriculture ⁽¹⁾. This is the case for communities in the Project area. The main challenges relating to groundwater in Malawi are the over-exploitation of groundwater resources due to inadequate control measures taken. Secondly, it is the poor quality as a result of pollution caused by cities, industries and agricultural practices ⁽²⁾. The Project area suffers from over abstraction, however quality has not been reported as an issue by community users.

5.2.6 *Surface Water*

Malawi is endowed with a vast expanse of surface water systems, which include its network of rivers and four major lakes. The Lilongwe River which flows into Lake Malawi is approximately 7 km south of the Project site. Lilongwe is one of the major tributaries of the Linthipe River. The Project site is also located approximately 29 km west from Lake Malawi.

Lake Malawi is approximately 560 km long and 75 km across at its widest point. Maximum depth is around 700 m ⁽³⁾. The Lake experiences marked seasonal variations in wind, temperature and precipitation.

There are no permanent surface water bodies on or near to the Project site, although the Lilongwe River is located approximately 7 km south of the Project site and the Namanda River is 500m to the east. However, the western and central sections of the Site do become waterlogged/flooded during the wet season (*Figure 5.7*).

5.2.7 *Aquatic Ecology*

Aquatic ecosystems cover about 20 percent of the total surface area of Malawi and are habitats to a diversity of fish and other aquatic fauna and flora. Major aquatic ecosystems in Malawi include lakes (Malawi, Malombe, Chilwa, Kazuni and Chiuta), rivers (Songwe, South Rukuru, North Rukuru, Dwangwa, Linthipe, Shire, Bua River), wetlands and other small water bodies. Lake Malawi and the River Lilongwe are located near the Project site although there are no permanent surface water resources on the Project site supporting aquatic ecology.

(1) Republic of Malawi (2010), Nkhoskoto District Social Economic Profile, Nkhoskoto District, Nkhoskoto

(2) Republic of Malawi (2010), Nkhoskoto District Social Economic Profile, Nkhoskoto District, Nkhoskoto

(3) World Bank (2013), Independent Environmental Impact Assessment for the Upgraded Kamuzu Barrage – Final ESIA Volume 1: Main Report, World Bank

5.3 *BIOLOGICAL BASELINE*

5.3.1 *Regional Context*

Terrestrial Ecoregions

The proposed Project site falls within the Central Zambezian Miombo Woodland ecoregion. This is one of Africa's largest Miombo ecoregions, which stretches across Central Africa below the equator and includes much of central and northern Malawi. This ecoregion has the highest plant species richness and diversity within the Miombo biome and has a higher proportion of Miombo woodland types. The soils are highly weathered, well-drained, leached and nutrient-poor, and tend to be acidic with low proportion of organic matter. The canopy is 10 to 20 m tall and is dominated by broad-leaved species of *Brachystegia*, *Julbernardia* and *Isoberlinia* trees. The understory is lush, comprising grasses, broad-leaved shrubs and geophytes.

Although the Project site and transmission line wayleave fall within the Central Zambezian Miombo Woodland ecoregion, these areas are considered Modified habitat. The reasons for this assessment are provided in the sections below.

5.3.2 *Vegetation Types in the Project Area*

At a finer scale, the proposed Project area and the transmission line fall within a transition zone between two vegetation types (*Figure 5.13*). These are:

- Deciduous Tree Savannah. In Malawi, this vegetation occurs mostly between Lilongwe and Dedza on the central plateau, with an outlying area north-east of Kasungu. The deciduous trees *Pterocarpus angolensis* and various *Combretum* species are dominant, while other important trees are *Pericopsis angolensis*, *Terminalia sericea*, *Burkeya africana*, *Xeroderris stulmannii* and *Acacia* species are dominant.
- Seasonal Valleyhead Wetland. This is a low-gradient wetland, mostly without defined channels. This wetland is located on the low land to the western part of the proposed Project area. It does not provide winter base flows, and is therefore not important for stream flow maintenance. This habitat is dominated with emergent grasses, sedges and aquatic plants such as *Leersia hexandra*, *Cyperus laeovigatus* and *Scirpus littoralis* among others.
- Subsistence Agriculture. This primarily occurs along the transmission line wayleave.

5.3.3

Overview of the Field Survey

The Project site covers an area of 168 ha and the transmission line wayleave covers an area of 12 ha. This section focuses on the terrestrial ecology within the Project footprint, which includes the transmission line.

A field survey was undertaken during the late wet season (25-26 April, 2018) to collect biodiversity baseline data, assess sensitive habitats, identify present ecological state of the proposed Project site, and ecosystem services that are found on the site. The fauna, flora, ecosystem services and sensitivity of each habitat are described below.





Ana (<i>Fiadherbia</i>) Trees Interspersed with Agricultural Fields on Project Site	Mango Trees and Adjacent Agricultural Fields on Project Site
	
Western portion of the Project Site. It is expected that this area will become water logged or experience some flooding in the wet season.	Baobab Trees Present on Project Site (Baobabs are not considered culturally significant to the Kanzimbe Community)
	

Figure 5.12 *Project Site Photos (Source ERM Field Survey, 2018)*

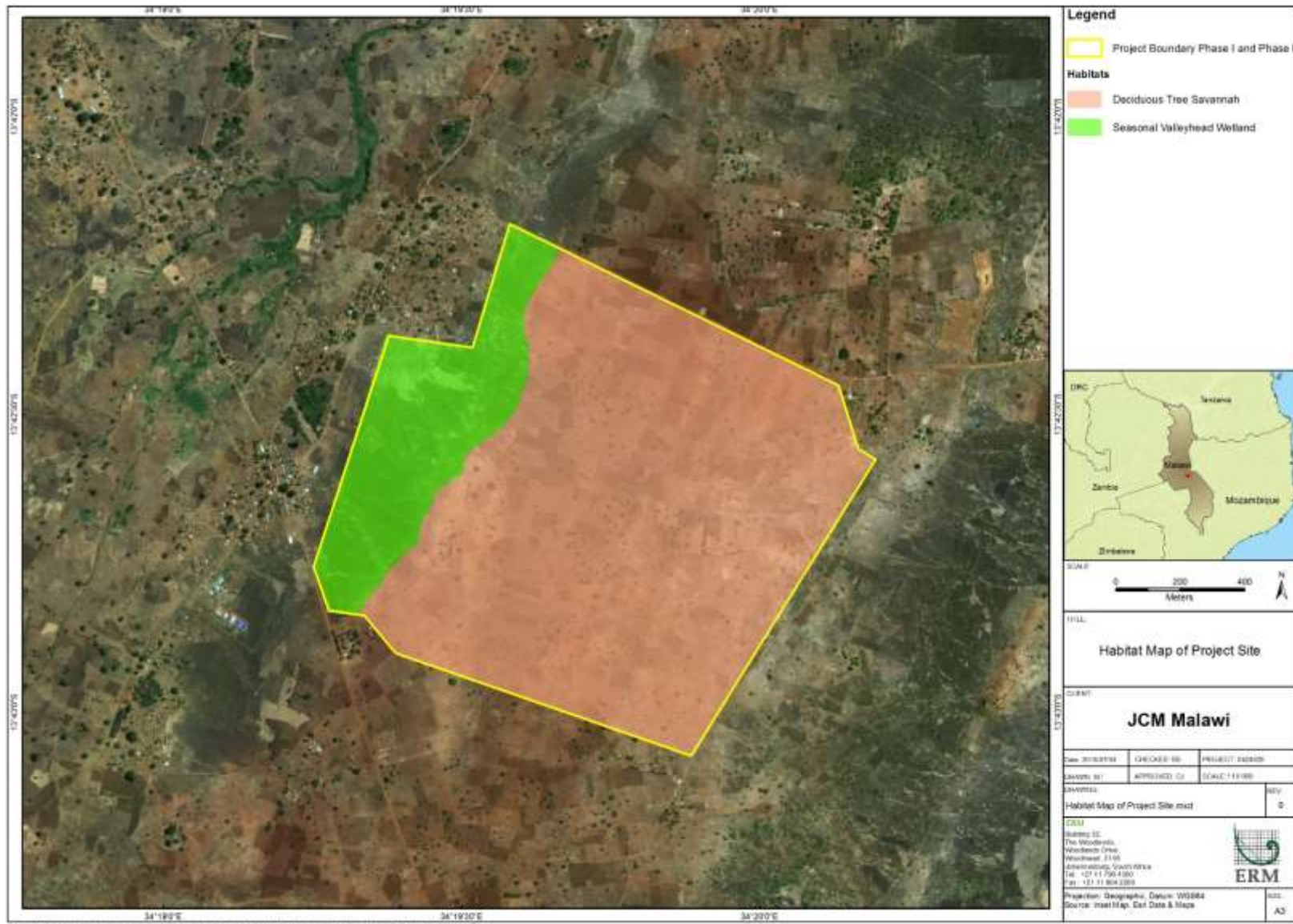


Figure 5.13 Map Showing Habitat Types in Project Site (Source ERM, 2018)

5.3.4

Deciduous Tree Savannah Habitat

The habitat is generally flat land and is predominantly used for subsistence agriculture (*Figure 5.14*). Crops cultivated on the Project site include maize, cotton, sorghum, pumpkins, groundnuts, beans, soya and tobacco among others. Trees on the site include natural, planted and fruit trees such as mangoes which are harvested for consumption and sale.



Figure 5.14 A Portion of the Deciduous Tree Savannah within the Project Site (Source ERM Field Survey, 2018)

Fauna

Avifauna

A total of eight bird species were recorded from the Project site and are indicated in *Table 5.2*.

Table 5.2 Bird Species Identified on the Project Site

Scientific Name	Common Name	Comment
<i>Myioparus griseigularis</i>	Grey-throated Tit-Flycatcher	Common resident bird
<i>Pyconotus barbatus</i>	Common Bulbul	Common resident bird
<i>Streptopelia semiforquata</i>	Cape Turtle Dove	Resident bird
<i>Tauraco corythaix</i>	Kynsna Lourie	Rare bird
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Eucleptes psammocromius</i>	Mountain marsh Widowbird	Rare bird
<i>Cyanomitra verticalis</i>	Green headed Sunbird	Common resident bird

No alien, threatened or endemic species were recorded during the site survey. All species listed below have an IUCN conservation status of Least Concern (LC).

Mammals

No mammal species were observed on the Project site during the site survey. No large mammal species are expected, however, communities reported that the Project site does harbour some species of small mammals, as presented in (Table 5.3).

Table 5.3 Small Mammal Species Reported to occur at the Project Site

Scientific Name	Common Name	Comment
<i>Lophuromys flavopunctatus</i>	Rodent	Common resident mammal in cultivated lands
<i>Praomys delectorum</i>	Rodent	Common resident mammal in cultivated lands
<i>Mus spp.</i>	Mice	Common resident mammal in cultivated lands
<i>Lepus microtis</i>	African Hare	Rare
<i>Epomophorus wahlbergi</i>	Fruit bat	Rare

No threatened or endemic species of mammal were recorded from the Project site during the fieldwork. The IUCN conservation status of the *Lepus microtis* (African hare) and *Epomophorus wahlbergi* (fruit bat) Least Concern (LC) while other remaining species are not threatened. No alien species of mammal was observed or reported to occur at the proposed Project site by the Project affected communities.

Flora

The Project site has been largely cultivated with dryland crops such as *Zea mays* (corn Maize), *Sorghum dochna* (Sorghum), *Arachis hypogaea* (groundnuts), *Gossypium arboreum* (cotton), *Cucumis anguria* (maroon cucumber), *Citrullus lanatus* (water melon), *Mandifera indica* (Mango), *Glycine max* (Soya bean), *Ipomoea batatas* (Sweet Potato), *Cucumis melo* (cucumber), and *Phaseolus vulgaris* (common bean).

The Project site has both indigenous and planted plant species, including fruit trees. A total of 64 terrestrial flora species were recorded from the Project site and these are presented in *Annex A*. The most abundant species were *Faidherbia albida* (Msangu) and *Combretum* spp. (mswaswa). No endemic flora species was recorded from the Project site during the fieldwork. Two threatened species of flora presented in *Table 5.4* were identified outside the Project site.

Table 5.4 *Threatened Species of Flora Recorded from the Deciduous Tree Savannah of the Project Site*

Scientific Name	Common Name	National Red List	IUCN Red List
<i>Pterocarpus angolensis</i>	African teak tree or Mlombwa	Vulnerable (VU)	Near-threatened (NT)
<i>Dalbergia melanoxylon</i>	African blackwood or Mphingo	Endangered (EN)	Near-threatened (NT)

The tree density of the Project site is approximately ten mature individual stems per hectare. This indicates that the plant biomass to be lost during the construction of the Solar Power Plant would be negligible and this cannot substantially contribute to local climate change of the area.

One alien invasive species of flora namely; *Gmelina arborea* was recorded on the Project site during the field survey. There were other flora species such as *Moringa oleifera* and *Melia azedarach* that are alien to the Project site but their potential to be invasive has not yet been established.

Sensitivity of the Deciduous Tree Savannah within the Project Site

The continuous cultivation of the proposed Project site by subsistence farmers for agriculture has led to the:

- presence of moderate diversity of taxa (plants and/or animals) relative to diversity expected under natural conditions;
- moderate numbers of locally sensitive taxa such as *Pterocarpus angolensis*, *Dalbergia melanoxylon*;
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions; a
- presence of alien invasive species such as *Gmelina arborea* including other alien species e.g. *Moringa oleifera*, *Melia azedarach* and *Senna obtusifolia* – these are non-native origin plant species that have been introduced on the Project site by communities for timber, fuelwood and/or fruits.

Based on the above attributes, the Project site is classified as a *Modified Habitat*, with limited capacity to support a diversity of fauna and flora species.

5.3.5 *Seasonal Valleyhead Wetland Habitat*

The habitat is generally a flood plain seasonal valleyhead wetland which is used for grazing livestock such as cattle and goats (*Figure 5.15*). The seasonal valleyhead wetland is part of the Project site and is located on the western portion of the Project site. The area is colonised by seasonal wetland grasses such as *Leersia hexandra* and *Urochloa mossambicensis* among others. There are also scattered shrubby trees on the site and the dominant species are *Combretum spp.* These grasses are also ecologically important as they regulate floods in the area.



Figure 5.15 *Part of the Seasonal Valleyhead Wetland of the Project Site (Source ERM Field Survey, 2018)*

Fauna

Avifauna

Three terrestrial and one water bird species were recorded from the Seasonal Valleyhead Wetland of the Project site during the field survey. Species recorded from this Project site are indicated in *Table 5.5*. No threatened species

or endemic species were recorded from the Seasonal Valleyhead Wetland during the field work. All species listed above have an IUCN conservation status of Least Concern (LC). No alien species of birds were recorded from or observed in the Project site during the field survey.

Table 5.5 *Bird Species Identified on the Seasonal Valleyhead Wetland*

Species Name	Local Name	Comment
<i>Myioparus griseigularis</i>	Grey-throated Tit-Flycatcher	Common resident bird and
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Bubulcus ibis</i>	Cattle Egret	Common waterbird

Mammals

Livestock were the only mammals seen in this habitat. No threatened species or endemic species of mammal were recorded, and no alien mammal species was reported by communities to occur there.

Flora

There were five wetland flora species that were recorded from this habitat during the field survey, as presented in *Table 5.6*. No threatened or endemic wetland flora species was recorded from this habitat during the fieldwork. No alien invasive wetland flora species were recorded from the habitat type during the field survey.

Table 5.6 *Flora Species Identified on the Project Site*

Scientific Name	Common Name	Comment
<i>Leersia hexandra</i>	Club head cutgrass	Common tree typical of seasonal wetlands.
<i>Cyperus laevigatus</i>	Smooth sedge grass	Common grass, typically seasonal wetlands
<i>Scirpus littoralis</i>	Bulrush	Common grass, typically seasonal wetlands
<i>Sporobolus consimilis</i>	Drop-seed grass	Common grass, typical of seasonal wetland characterising alkaline conditions.
<i>Urochloa mosambicensis</i>	Signalgrass	Grass, typical of dry conditions and seasonal wetlands

Sensitivity of the Seasonal Valleyhead Wetland within the Project Site

Continuous livestock grazing on this habitat by local communities in the Project area has led to:

- presence of moderate diversity of taxa (plants and/or animals) relative to diversity expected under natural conditions;
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions; and

- alien species may be present as a result of habitat disturbances.

This Seasonal Valleyhead Wetland habitat is classified as a *Modified habitat*, although it has some potential to support species of biodiversity (fauna and flora).

5.3.6 *Subsistence Agricultural Land (Transmission Line)*

The habitat along the route of the proposed transmission line is generally flat land and predominantly used for subsistence agriculture (*Figure 5.16*). Crops cultivated along the route include maize, cotton, sorghum, pumpkins, groundnuts, beans, soya and cow peas among others. Trees that were found along the proposed transmission line route include natural and planted.



Figure 5.16 *Photo Showing a Portion of the Habitat along the Proposed Transmission Line Route (Source ERM Field Survey, 2018)*

Fauna

Avifauna

Seven terrestrial and resident bird species were recorded from the habitat of the transmission line, as presented in *Table 5.7*. None of these are threatened nor endemic. No alien species of birds were recorded or observed from the proposed route of the transmission line in the habitat of during the field survey

Table 5.7 Bird Species Identified from the Proposed Transmission Line Route

Scientific Name	Common Name	Comment
<i>Pyconotus barbatus</i>	Common Bulbul	Common resident bird
<i>Merops pusillus</i>	Little Bee-eater	Common resident bird
<i>Streptopelia semiforquata</i>	Cape Turtle Dove	Resident bird
<i>Tauraco corythaix</i>	Kynsna Lourie	Rare bird
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Eucleptes psammocromius</i>	Mountain marsh Widowbird	Rare bird
<i>Cyanomitra verticalis</i>	Green headed Sunbird	Common resident bird

Mammals

No mammal species were observed along the proposed transmission line route during the field survey, and no large mammals expected to be encountered. It is however, expected that the area may harbour various rodent species. Spoor of hare were observed during the survey, which indicate that small mammals do occur. Local communities reported four species of small mammals that occur along the route of the proposed transmission line, as presented in Table 5.8. None of these mammals are listed as threatened or endemic. No alien species of mammal was observed by the project team or reported to occur at the proposed Project site by the communities.

Table 5.8 Small Mammal Species Reported to occur at the Project Site

Scientific Name	Common Name	Comment
<i>Lophuromys flavopunctatus</i>	Rodent	Common resident mammal in cultivated lands
<i>Praomys delectorum</i>	Rodent	Common resident mammal in cultivated lands
<i>Mus spp.</i>	Mice	Common resident mammal in cultivated lands
<i>Lepus microtis</i>	African Hare	Rare
<i>Epomophorus wahlbergi</i>	Fruit bat	Rare

Flora

The majority of the transmission line wayleave has been cultivated with dryland crops such as corn maize, millet, sorghum, groundnuts, cotton, cucumber, watermelon, mango, soya bean, sweet potato and common bean. The area also has a good number of both indigenous and planted plant species, including fruit trees. The most common species were *Faidherbia albida* (Msangu) and *Combretum* spp. (Mswaswa).

The same threatened tree species observed in the Project site (Table 5.4) were found along the proposed transmission line. No endemic flora species were recorded. Two alien invasive plant species, *Gmelina arborea* and *Eucalyptus globules* were recorded from the proposed transmission line during the field survey. Other alien flora species such as *Moringa oleifera* and *Melia azedarach* were observed but their potential to be invasive has not been established.

The tree density along the proposed transmission line route was estimated at about eight mature individual stems per hectare, and suggests that minimal plant biomass will be lost during the construction phase of the Project.

Sensitivity of the Habitats along the Proposed Transmission Line Route

The continuous cultivation of the land traversed by the proposed transmission line by subsistence farmers for agriculture has led to the following observations:

- presence of moderate diversity of taxa (plants and/or animals) relative to diversity expected under natural conditions;
- moderate numbers of sensitive taxa such as *Pterocarpus angolensis*, *Dalbergia melanoxylon*;
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions; and
- presence of alien invasive species such as *Gmelina arborea* and *Eucalyptus globulus* including other alien species e.g. *Moringa oleifera*, *Melia azedarach* and *Senna obtusifolia* – these are non-native origin plant species that have been introduced on the Project site by communities for timber, fuelwood and/or fruits.

Habitats along the proposed transmission line route were therefore classified as ***Modified***.

5.3.7 *Assessment of Ecosystem Services*

This analysis assesses ecosystem services in accordance with the approach adopted by the World Research Institute (WRI) ⁽¹⁾, which complies with requirements of the IFC Performance Standard 6 (PS6). The WRI approach provides a breakdown of ecosystem services that are classified into Provisioning, Regulating, Supporting and Cultural Services. This list has been adjusted to match the suite of services that are relevant to the areas associated with the Project site, which will be referred to as the Project. The WRI approach provides a simple and logical process to identify priority Ecosystem Services (*Figure 5.17*). The PS6 requires that disruptions to priority ecosystem services are assessed as part of an impact assessment, with mitigation measures developed to address the impacts.

(1) World Research Institute (WRI) approach to assessing Ecosystem Services is available at: https://www.wri.org/sites/default/files/weaving_ecosystem_services_into_impact_assessment.pdf

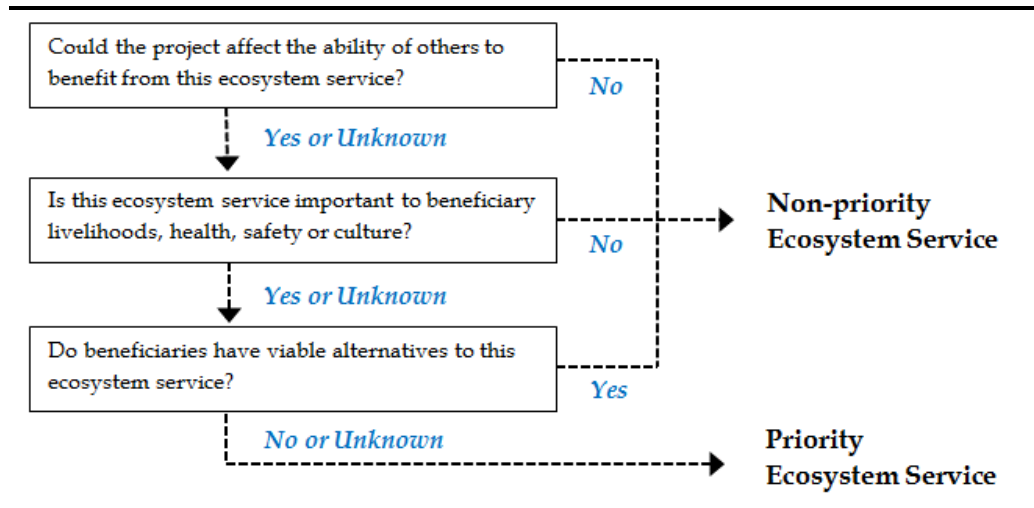


Figure 5.17 *Logical Approach for Prioritisation of Ecosystem Services Adopted by the World Research Institute*

During the site survey, various ecosystem services were reported by communities and/or observed by the project team. The use of ecosystem services, dependence of local beneficiaries and an assessment of replaceability have been investigated through processes of consultation and incorporating expert opinion.

An overview and description of ecosystem services relevant to the Project area is provided in *Table 5.9*, together with a high-level assessment of the potential impact, dependence of beneficiaries and replaceability of services. These assessments are used to identify priority services based on the logical framework illustrated in *Figure 5.17*.

Table 5.9 Description and Assessment of Ecosystem Services in the Project Area and along the Proposed Transmission Line Route

Ecosystem Service	Description of the Service	Location Relevance	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
PROVISIONING ECOSYSTEM SERVICES						
Crops cultivated at the Project site are source of food and income	There are a number of cultivated food crops such as maize, groundnuts, soya bean, cucumber, watermelon, sorghum, cassava and cow peas that are grown on the Project site between December and May each year. These food crops are harvested by subsistence farmers for consumption and income.	Tree Savanna Transmission Route	Yes The project will displace cultivated land and impact on peoples' livelihoods	Yes Crops cultivated are sources of food and income to farmers	No There is a high demand for land, which is leading to a decline in the fallow period, and hence no replacement land available. This assessment is unable to confirm the replaceability of arable land as it is the Chief's responsibility to allocate land for cultivation.	Priority Ecosystem Service
Livestock grazing land	Habitat is used for livestock (cattle and goats) grazing. It was reported by communities that the Project site supports over 80 livestock that feed on grasses found on the seasonal wetland.	Valleyhead Wetland Transmission Route	Yes The project will displace grazing resources and lead to reduced foraging areas for livestock	Yes Livestock are an important source of protein and revenue for communities	Yes There are other large seasonal wetlands downstream of the Project site	Non-priority ES
Bush meat	Wild animals that are hunted on the Project site and along the transmission route for bush meat include mice, hare and birds. These animals are sources of proteins to communities.	Tree Savanna, Valleyhead Wetland Transmission	Yes The project will reduce people's access to hunting areas leading to a decline in the	No Only small animals are hunted and are not a staple protein source for communities.	Yes The birds, mice and grasshoppers found at the Project site are also found in other areas nearby	Non-priority ES

			availability of bush meat.			
Fuelwood	Various trees, especially the exotic species are regularly harvested for fuelwood for cooking.	Tree Savanna Transmission Route	No The project will not contribute to the impact on scarcity of fuelwood in the area	Yes Fuelwood is important, especially to old women and young girls from surrounding villages.	Yes There are plenty of trees in adjacent areas of the Project site and more trees for fuelwood can be planted at households.	Non-priority ES
Natural medicine	Some species of flora found on the Project site and along the transmission line route are harvested by communities to be used in traditional medicine which cure various illnesses.	Tree Savanna, Valleyhead Wetland Transmission	Yes The project will have impact on people due to loss of some medicinal plants	Yes Medicinal plants are used to treat various illnesses at local level	Yes Medicinal plant species found on the Project site are also found in other agricultural and woodlands found in the area	Non-priority ES
Thatch grass	The Project site has some thatch grass that communities harvest for thatching their houses and for sale.	Tree Savanna Transmission Route	Yes Clearing of grass such as <i>Hyparrhenia filpedula</i> , <i>Heteropogon contortus</i> , <i>Melinis repens</i> to pay way for the construction of the project will have impact on people	Yes Grass is used for thatching houses and livestock pens, but is also sold for income by villagers	Yes Thatch grass is also found on other customary lands found in the Project area and can be alternative source	Non-priority ES
Wild plant fruits	The Project site and TL route are a home to some wild plant fruits such as <i>Vitex mombasa</i> , cucumber and <i>Ximenia americana</i> which are harvested by communities living around for food.	Tree Savanna Transmission Route	Yes The project will have impact on peoples' livelihoods due to turning of agricultural into industrial land.	Yes Wild plant fruits such as <i>Ximenia americana</i> , <i>Vitex mombasae</i> found at the Project site are source of food to	Yes The wild plant fruits can be planted elsewhere and are also commonly found in	Non-priority ES

				communities around	other farmlands and bush areas.	
REGULATING ECOSYSTEM SERVICES						
Regulation of soil fertility	Tree species such as <i>Faidherbia albida</i> are retained by farmers as a source of nitrogen in the soil. It was estimated that the Project site has over 70 mature individual species of <i>Faidherbia albida</i> . Grass species such as <i>Urochloa mosambicensis</i> and other species regulate soil quality of the habitat.	Tree Savanna, Valleyhead Wetland Transmission	Yes Clearing plants on the Project site and Transmission Line route will have impact on the fertility of soil	Yes Communities depend on soil fertility for crop production.	Yes Alternative means of fertilising soil are possible.	Non-priority ES
Pollination of crops	The Project site and Transmission Line route support a diversity of insects such as butterflies, which pollinate agricultural crops on the Project site	Tree Savanna, Valleyhead Wetland Transmission	Yes Clearing of the Project site will have impact on pollinating insects such as butterflies, bees, but the significance is very low.	Yes Pollinating insects are important for production and productivity of crops	Yes It is possible to replace plants which are homes to insects to be lost during the construction by planting	Non-priority ES
Regulation of water flows	The wetland grasses and sedges found on the western part of the Project site are important in prevention of floods.	Valleyhead Wetland Transmission Route	Yes The project will have impact on regulation of water flows especially during rainy season due to clearing of the seasonal wetland	Yes The seasonal wetland regulates flow of water so that the water is not flooding which can be detrimental to lives of people and livestock	No It is not possible to replace it.	Priority Ecosystem Service
Soil erosion control	The Project site has grasses which are important in prevention of floods.	Tree Savanna, Valleyhead Wetland Transmission	Yes Clearing of grasses on the Project site will have impact on soil erosion	Yes Clearing of grasses from the Project site will not be of any benefit to farmers as	Yes It is possible to replace the loss of grasses through planting	Non-priority ES

				fertile soil will get lost		
CULTURAL ECOSYSTEM SERVICES						
Ethical values	The Project site has some trees such as <i>Faidherbia albida</i> which ethically influence peoples' desire to protect them as they fix nitrogen in the soil.	Tree Savanna Transmission Route	Yes The project will have impact on ethical values of communities	Yes Clearing of plants such as <i>Faidherbia albida</i> and other trees that farmers protect because of their social value will have impact on ethical values of the people	Yes It is possible to replace them and a lot of similar species are found on cultivated farmlands in the district	Non-priority ES
SUPPORTING ECOSYSTEM SERVICES						
Biodiversity maintenance	The Project site has the potential to support biodiversity such as trees, insects and birds.	Tree Savanna, Valleyhead Wetland Transmission	Yes The Project area and Transmission Line route supports habitat which will be impacted through vegetation clearing, installing of transmission lines and faunal disturbance.	Yes Biodiversity underpins a host of ecosystem services, many of which are discussed above.	No There is no replacement of biodiversity and its capacity to underpin the wide diversity of other ecosystem services that are present.	Priority Ecosystem Service

5.3.8 *Outcome of the Ecosystem Services Assessment*

Table 5.9 reveals there is a wide diversity of ecosystem services present in the Project area, many of which are underpinned by biodiversity and all are important to community well-being in the area. Three of these ecosystem services have been prioritised through an assessment of likelihood of impact by the project, dependence of communities and lack of available alternatives (replaceability). However, this ESIA has been developed covering many different aspects, and disruptions to each of these prioritised ecosystem services is addressed through appropriate mitigation.

5.3.9 *Overall Sensitivity Assessment*

Habitats in the near vicinity of the Project show considerable evidence of transformation, with the overall floral and faunal species composition showing a divergent change from the natural state. The vegetation is dominated by plant species that provide benefits to local communities, with many non-beneficial species having been eliminated through settlement and cultivation practices. As a result there are many species of non-native origin present. Human activity has substantially modified an area's primary ecological functions and species composition, and the habitats there conform to modified habitats as described in PS6 (paragraph 11).

The Project is not located within the vicinity of protected areas, no highly threatened or range restricted floral or faunal species are considered likely to be present, and no large congregations of species are expected to occur. What remains of the habitats are representative of a widespread vegetation formation, and are therefore not unique. Based on these observations, no critical habitats are expected to occur, and a critical habitat assessment following IFC PS6 is therefore not necessary.

The ecological sensitivity of the Project area is therefore considered to be low. PS6 does not stipulate minimum requirements for developments within modified habitats, but states measures should be taken to minimise impacts on remaining biodiversity and implement mitigation as appropriate.

6.1 INTRODUCTION

This Section provides a description of the current social baseline conditions in the Project direct and indirect AoI. The baseline serves as the reference point against which changes can be predicted and ultimately monitored.

The baseline was determined through review of existing secondary information including published reports and ESIA's. For the social baseline, publicly available information has been supplemented through first-hand observations and interviews conducted during site visits. The current socio-economic baseline conditions at various levels in Malawi including national, regional, district, and community level are described.

6.2 AREA OF INFLUENCE

See *Section 5.1*.

6.3 SOCIO-ECONOMIC ENVIRONMENT

6.3.1 Introduction

This Section describes the current socio-economic context of the DAoI associated with the Project. The information presented in this Section is based on both primary and secondary data sources (eg census data, government reports and online sources). The data used for this baseline includes data gathered for the LACS and CSR feasibility studies (as described in *Chapter 1*).

6.3.2 Primary Data Collection Activities

Primary data was gathered between 15-19 January 2018 as part the LACS studies, and additional data was subsequently collected in June 2018 to ensure a representative sample of data for the ESIA.

Primary data gathering activities included the following:

- **Focus group discussions (FGD):** A sample of FGDs were undertaken with women, men and youth to gather gender differentiated information on project perceptions, gender roles, quality of life, access to public services, health issues, livelihoods etc as well as issues that affect youth (eg education and employment). It should be noted that the LACS FGD data incorporated into this baseline from Kanzimbe and Mayambo included participatory rural appraisal approaches, such as gender matrices and

access and control frameworks to gather more focused information on gender roles, equality and discrimination.

- **Key informant interviews (KII):** KIIs were held with professionals and those with knowledge of specific topic areas and on project perceptions including health workers, teachers, Non-Government Organisations (NGOs) and Savelugu district departments.
- **Village profiles:** Undertaken in a sample of villages to gather village level data on demographics, public infrastructure, livelihoods, cultural heritage etc.
- **Household surveys:** Undertaken in Kanzimbe and Mayambo in January 2018 for the LACS studies, and later in May/June 2018 for Phase II land acquisition activities, to support the development of a LRP. However, as the LRP was in progress at the time of writing this ESIA, only household survey data from the LACS household survey data is included in this baseline where appropriate, covering Kanzimbe and Mayambo only.

Focus groups and village profiles were primarily undertaken in Kanzimbe, Mayambo, Waya and Sadzu as they are spread across the DAoI and are impacted by the land acquisition process.

A full list of meetings is provided in *Annex B*. Pictures of various data gathering activities are presented in *Figure 6.1* below.



Figure 6.1 *Pictures of Meetings (Source ERM Field Survey, 2018)*

6.3.3 *Geography and Administrative Structure*

Malawi is a landlocked country situated in the southeast of the African continent, bordered by Tanzania to the north, Mozambique to the east, Zimbabwe to the south, and Zambia to the west.

Malawi has three regions; northern, central and southern. It is divided into 28 districts, which are further divided into constituencies that are represented by Members of Parliament (MPs) as well as wards represented by local

councillors ⁽¹⁾. Each district is further divided into Traditional Authorities (TA), and sub-divided into Group Villages, each with its own leader, known as a Group Village Headman (GVH).

The Project is situated in the central region of Malawi, approximately 30 km from the Salima District Centre, and within Kalonga TA. In Kalonga TA, there are 42 GVH ⁽²⁾. The Group Villages of Kanzimbe and Sadzu are the villages that will be impacted by the Project.

Figure 6.2 shows the institutional structure and the key representatives for each level.

The District Commissioner (DC) is the head of the District Government and has overall authority regarding land, development, and infrastructure. The DC is the first point of call for all project developers requiring land, and to date has been instrumental in the land acquisition and compensation process undertaken to date for ProjectCo.

The Kalonga TA / Senior Chief is custodian of the land in the TA and is responsible for overseeing 42 GVH's. Each GVH is responsible for representing the communities within their Group Village, supported by each village's own individual Headmen. Women are only represented through the Village Development Committees (VDCs) and other Community Based organisations (CBOs), and not in the institutional structure.

(1) Government of Malawi, Health Sector Strategic Plan 11 (2017-2022). Available at http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/malawi/health_sector_strategic_plan_ii_030417_smt_dps.pdf (accessed March 2018)

(2) The number of GVH in Kalonga was reported by the TA during social surveys undertaken for LACS and CSR Feasibility Studies undertaken by ERM in January 2018.

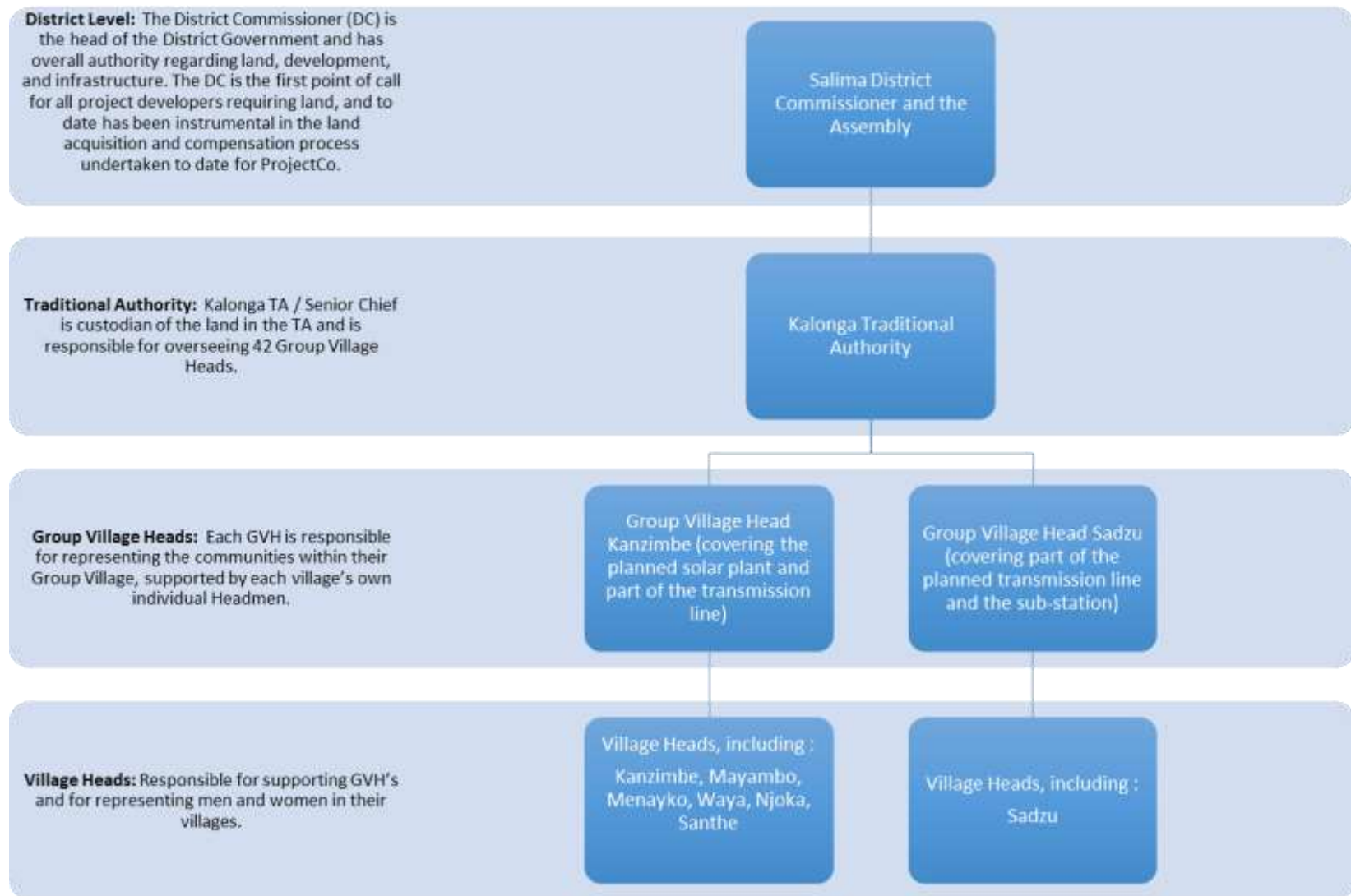


Figure 6.2 Institutional Structure

*Population***National and District Level**

In 2017, the estimated population of Malawi was 17.4 million people, with an average annual growth rate of 2.7% ⁽¹⁾. Between 1966 and 2012, the population grew by four million people and is predicted to reach 23 million in 2025 ⁽²⁾. Malawi is predicted to experience an average annual urban population growth rate of 4.2% from 2013 to 2030 ⁽³⁾. This is reportedly due to a decline in the mortality rate resulting from improvements in healthcare and nutrition, and ongoing high fertility rate averaging at six children per family ⁽⁴⁾. As reflected by the fertility rate, Malawi has a young population with 64% of the total population under the age of 15, 18% under the age of five and only 3% above 65 years ⁽⁵⁾.

At the time of the 2008 census, the population in Salima District was 337,895 people and on average 4.14 people per household ⁽⁶⁾. According to the 2015-2016 Malawi Demographic and Health Survey (MDHS) the fertility rate in Salima was 5.6 births for the three year period prior to the survey ⁽⁷⁾, in comparison to 3.8 in the capital of Lilongwe. This is due to the rural nature of the District in combination with high levels of poverty and low levels of education. The MDHS states that fertility decreases as wealth of the household increases ⁽⁸⁾.

Local level

At the local level, the population of the villages in the Project area varies. Kanzimbe and Sadzu have the largest population as they are situated in the centre of the GVH's. *Table 6.1* shows the reported population in the villages.

(1) Government of Malawi, Health Sector Strategic Plan 11 (2017-2022). Available at http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/malawi/health_sector_strategic_plan_ii_030417_smt_dps.pdf (accessed March 2018)

(2) Department of Population and Development, Ministry of Economic Planning and Development (nd) Why Population Matters to Malawi's Development. Available at <https://assets.prb.org/pdf12/malawi-population-matters.pdf> (accessed March 2018)

(3) Government of Malawi, Health Sector Strategic Plan 11 (2017-2022). Available at http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/malawi/health_sector_strategic_plan_ii_030417_smt_dps.pdf (accessed March 2018)

(4) Department of Population and Development, Ministry of Economic Planning and Development (nd) Why Population Matters to Malawi's Development. Available at <https://assets.prb.org/pdf12/malawi-population-matters.pdf> (accessed March 2018)

(5) Government of Malawi, Health Sector Strategic Plan 11 (2017-2022). Available at http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/malawi/health_sector_strategic_plan_ii_030417_smt_dps.pdf (accessed March 2018)

(6) Malawi Statistics. Available at <http://malawi.opendataforafrica.org/#> (accessed March 2018)

(7) Government of Malawi, 2015-16 Demographic and Health Survey. Available at <https://dhsprogram.com/pubs/pdf/SR237/SR237.pdf> (accessed March 2018)

(8) Government of Malawi, 2015-16 Demographic and Health Survey. Available at <https://dhsprogram.com/pubs/pdf/SR237/SR237.pdf> (accessed March 2018)

Table 6.1 *Reported Population in the Project Area*

Community	Reported Population	Reported Number of Households	Average of Household Size	Gender Ratio (%)	
				Male	Female
Kanzimbe	2,160	360 (108 FHH)	6-7	40	60
Mayambo	475	95 (15 FHH)	5	48	52
Waya	680	100 (25 FHH)	6-7	45	55
Santhe	222	37 (FHH not available)	6	40	60
Sadzu	2,000	400 (30 FHH)	5	40	60

Notes:

The reported population is from the GVH's and the VHs.

FHH refers to female-headed households

Source: ERM Social Surveys, 2018

As shown in the table, the average household size is slightly above the District average, primarily due to the rural context of the villages and lack of contraceptive use. Each household in the Project area has their own house. Additionally, females represent a higher proportion of the population in villages resulting from the matrilineal system in the Project area, whereby men move into the village of their wife. This, in combination with women having a higher life expectancy than men, separations and/or divorces (as reported by women during social surveys) contribute to high proportion of female-headed households in the Project area.

Migration

National and District Level

At the end of 2008, Malawi had approximately 11,600 refugees and asylum-seekers, originating from Rwanda, Democratic Republic of the Congo (DRC) and Burundi ⁽¹⁾. However, since then the number of people who have fled to Malawi has risen from almost 17,000 in 2013 to more than 37,000 in March 2018 ⁽²⁾. Most refugees live in Dzaleka refugee camp, near the capital Lilongwe, which has a population of nearly 34,000 people. Additionally, more than 3,000 Mozambican asylum-seekers are in Luwani refugee camp, in the south of the country.

Additionally, changes in weather patterns have influenced migration. For example, in 2015 floods affected 1,101,364 people, displaced 230,000 and killed 106 people ⁽³⁾. Salima was one of the affected districts at the time. According to Malawi's National AIDS Control Program (NACP), male migration is more

(1) World Refugee Survey 2009 – Malawi. Cited on Refworld, available at <http://www.refworld.org/docid/4a40d2ac58.html> (accessed July 2018)

(2) United Nations High Commissioner for Refugees (UNHCR), Malawi. Available at <http://www.unhcr.org/malawi.html> (accessed June 2018)

(3) International Organisation for Migration. Malawi 2017, Humanitarian Compendium. Available at <https://humanitariancompendium.iom.int/appeals/malawi-2017> (accessed July 2018)

common, however, they also noted that both men and women (adults and youth) are increasingly mobile as they pursue trading activities ⁽¹⁾.

In Salima District, at the time of the development of the Socio-Economic Profile 2006, movement of people was generally within the district, keeping the population number steady. However, there may have been some migration to the district from elsewhere in search of land for farming ⁽²⁾.

Local Level

Within the Project area, Kanzimbe and Waya were the only villages with a reported increase in the population resulting from job seekers. In these villages, and also within Mayambo and Sadzu there have additionally been increases due to marriage and childbirth.

Ethnicity, Religion and Language

National and District Level

Although English is the official language in Malawi, Chichewa is the national language spoken by 57% of the population ⁽³⁾. There are six languages that are spoken in the Salima District. According to 1998 Population and Housing Census (the latest data regarding language), 80% of the people of Salima speak Chichewa, 10% Chiyao, 8% Chitonga, and 2% Chinyanja, Chitumbuka and Ngoni ⁽⁴⁾. The primary religion in Malawi and Salima is Christianity followed by Islam.

Local Level

The primary religion in the villages is Christianity. Chewa is the primary ethnicity, with Chichewa as the main language spoken.

6.3.5

Gender Context

National and District Level

High levels of poverty and traditional structures have created high levels of gender inequality and discrimination in Malawi. Additionally, customary law has legitimised practices such as polygamy, early marriage and wife inheritance in both matrilineal and patrilineal communities. These practices have reinforced stereotypes that consider women inferior to men ⁽⁵⁾

Table 6.2 shows the key gender indicators. The table shows that there are significant gender equalities in labour force participation (72% of females

(1) International Organisation for Migration. No date. Briefing Note on HIV and Labour Migration in Malawi. Available at https://www.iom.int/jahia/webdav/site/myjahiasite/shared/shared/mainsite/events/docs/Briefing_Notes_HIV_Malawi.pdf (accessed July 2018)

(2) Salima District Assemble, Salima Socio-Economic Profile 2006

(3) The language spoken in Malawi.-study country.com. Available at <http://www.studycountry.com/guide/MW-language.htm> (accessed November 2017)

(4) Salima District Assembly. Salima Socio-Economic Profile 2006. Available at http://www.malgamw.org/SalimaDistrict_SEP.pdf (accessed November 2017)

(5) FAO (2011) Gender Inequalities in Rural Employment in Malawi. Available at <http://www.fao.org/docrep/016/ap093e/ap093e00.pdf> (accessed March 2018)

compared to 82% of males), in progression to secondary education (84.4% of females compared to 90.6 males) and in decision making/ government positions ⁽¹⁾. Additionally, the adolescent fertility rate is also high in comparison to other countries in the region; 141 per 1,000 births in Malawi, compared to Zambia (86), Zimbabwe (105.8), Tanzania (116.6) ⁽²⁾. This is likely to reflect womens' role in decision making where they are least represented in Malawi compared to the same countries, in combination with low levels of education.

Table 6.2 *Gender Indicators*

Indicator	Females	Males
Labour force participation rate by sex (% of population ages 15+) (2016)	72%	82%
Unemployment rate (% of labour force, modelled International Labour Organisation estimate) (2016)	7.0%	5.1%
Life expectancy at birth (years) (2016)	65.8	60.6
School enrolment, secondary (%net) (2016)	30.8%	32.1%
Progression to secondary school (%) (2000)	84.4%	90.6%
Proportion of seats held by women in national parliaments (%) (2016)	16.7%	-
Proportion of women in ministerial level positions (%) (2016)	22.2%	-
Adolescent fertility rate (births per 1,000 women ages 15-19) (2016)	141.0	-
Fertility rate, total (births per woman)	4.6	-

Source: World Bank Gender Data Portal

Regardless of these figures, Malawi has made steps to address gender inequality and promote women's rights, including ratifying the main gender conventions, including Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) and the Protocol to the African Charter on Human and Peoples Rights on the Rights of Women in Africa. Malawi also adopted a National Gender Policy in covering the period 2007-2011, focusing on eight key areas including reproductive health, governance and human rights and gender based violence.

Gender Roles

Local Level

In the villages, women are generally responsible for childcare, farming, domestic responsibilities (cooking and cleaning), caring for the sick, gathering and pounding maize meal. Men primarily engage in income generating activities, such as bicycle taxis, selling farm produce or other grocery items and fish trading. Men in Santhe and Waya Villages, however, do not partake in fishing activities as they are far from the main fishing villages.

(1) World Bank Gender Data Portal. Available at <http://datatopics.worldbank.org/gender/country/malawi> (accessed July 2018)

(2) World Bank Gender Data Portal. Available at <http://datatopics.worldbank.org/gender/country/malawi> (accessed July 2018)

Men also engage in agricultural activities such as the establishment of new farms, land preparation, irrigation as well as fertilizer and pesticides application.

Access and Control of Resources / Gender Equality

Local Level

Due to the matrilineal system in Malawi, which enables women to own land, they have more control than men. Women also have greater access to credit as they are considered more financially responsible. However, men generally have greater access and opportunity to pursue an education due to their role as the 'bread winner'. Additionally, men have more control over finances and the marketing/sale of produce. This is because women are limited to their domestic role. Additionally, jealousy was reported amongst the men in relation to women leaving the house to access the market and in relation to access to technology, in particular women accessing mobile phones.



Men in Sadzu reported that they have more access to resources than the women. This is a similar situation in Waya and Santhe Villages, where men are dominant in the households. This can be attributed to the difference in the level of education between men and women.



Women in these villages control land and houses however decisions made are a shared responsibility between both men and women. There few instances where women are undervalued at both household and community level.

Table 6.3 provides an overview of the findings from the access and control exercise undertaken during LACS surveys in Kanzimbe and Maymbo Villages.

Table 6.3

Access and Control of Resources

Resource / Village									Comments Raised During FGDs
	Access		Control		Access		Control		
	K	M	K	M	K	M	K	M	
Land	♀	♀	♂	♂	♀	♀	♀	♀	<ul style="list-style-type: none"> • Even though women own land, women said that men have control. • Men said that women have control, as they move into their wives house after marriage.
Education and training	♂	♂	♂	♂	♂	♂	♂	♂	<ul style="list-style-type: none"> • As men pay fees, they decide who goes to school. • Girls are constrained by domestic chores. • Culture/ tradition affects girls desire for education; rather they are interested in marriage and children.
Technology	♂	♂	♂	♂	♂	♂	♂	♂	<ul style="list-style-type: none"> • Due to jealousy, men do not want their wives to have phones. • Men suggest they are more educated than women to use technology.
Cash	♂	♂	♂	♂	♂	♂	♂	♂♀	<ul style="list-style-type: none"> • Men have more access to paid labour and have the freedom to seek work stay at home. • Men make the final decisions on household income. • Sometimes men spend money on themselves and women are left to feed the children. • Men are more financially literate than women and therefore make financial decisions. • Men in Mayambo said financial decisions are made equally.
Credit/Loan	♀	♂	♂	♂	♀	♀	♂	♂♀	<ul style="list-style-type: none"> • Women are considered more responsible in paying loans. • Women have good access to loans. • It is easier to trace women for loan repayments than men. • Men control spending of the loan as they are more financially literate.
Marketing/selling	♂	♂	♂	♂	♂	♂	♀♂	♂♀	<ul style="list-style-type: none"> • Men do not allow their wives to access markets due to jealousy. • Men are more responsible for income generation. • Although men are more involved in marketing, women contribute to the decisions.
Labour / staff	♂	♂♀	♂	♂	♂	♂	♀♂	♂♀	<ul style="list-style-type: none"> • Women are more responsible when hiring labour. • Men create ghost labourers to finance the purchase of alcohol. • In Kanzimbe, decisions regarding labour are made equally.

Resource / Village					Comments Raised During FGDs							
	Access		Control						Access		Control	
	K	M	K	M					K	M	K	M

Legend:

K=Kanzimbe/ M=Mayambo

♀ = Female / ♂ = Male

Source: ERM social surveys, January 2018

Challenges Faced by Men and Women

Local Level

One of the main challenges faced by women and girls in both villages is gender based violence (GBV), rape and early marriage. This impacts on girls' education as they are forced to leave school due to early pregnancy.

Additionally, in Kanzimbe, reportedly girls and women are enticed by men with money and other valuables such as mobile phone in exchange for sex, leading unplanned pregnancies and sexually transmitted diseases including HIV/AIDS. Women also reported that they are sometimes abused by their husbands if they spend too much time fetching water or at the maize mill due to suspicion of their husbands.

Moreover, women in Kanzimbe stated that they have more work than men. Whilst women are doing domestic chores, men are enjoying leisure activities and resting.

The heads of the female-headed households in Waya and Santhe are sometimes ridiculed and viewed as prostitutes by other villagers. This generally leads to them feeling powerless compared to men and is evident in the children's behaviour towards their mothers.

Challenges raised by men were more economic in nature, in particular concerns around customers for their bicycle taxi service were raised. They also complained about the time women spend fetching water.

Generally, domestic violence is a major problem in Malawi. According to the MDHS survey, 47% of women experienced spousal violence in the Central Region ⁽¹⁾. Additionally, the survey suggests 60% of married women report that their husband insists on knowing where they are at all times ⁽²⁾, which reflects the situation in the villages in the Project area.

(1) Government of Malawi, 2015-16 Demographic and Health Survey. Available at <https://dhsprogram.com/pubs/pdf/SR237/SR237.pdf> (accessed March 2018)

(2) Government of Malawi, 2015-16 Demographic and Health Survey. Available at <https://dhsprogram.com/pubs/pdf/SR237/SR237.pdf> (accessed March 2018)

*Governance and Security***National and District Level**

Results from a national crime victimisation survey undertaken in 2012 suggest that the most common crimes in rural areas in Malawi are related to theft of crops (primarily maize) and livestock; 18.3% and 8.8% respectively of survey respondents ⁽¹⁾. This is because the majority of the population in these areas rely on subsistence and crop farming. The survey also suggests that the most common crime in urban areas is corruption; 13.1% in urban areas compared to 4.3% in rural areas ⁽²⁾. Burglary and petty crime/theft of personal property is also most common in urban areas due to lower rates of poverty and higher standards of living compared to rural areas.

Local Level

These statistics reflect the information gathered during the social surveys. The community policing committee reported that the most common crimes are livestock theft and burglaries. In Mayambo, women reported that generally the village is safe; however there have been cases of livestock theft when they are out fetching firewood or cutting grass.

Arson was reported in the District recently; however the motivation for this is unknown.

As mentioned in *Section 6.3.5 (Gender)*, gender-based violence is also common, and the committee reported the rape of a disabled girl.

*Human Rights Context***National and District Level**

According to the Malawi Human Rights Country Report (2016) ⁽³⁾, the main human rights issues prevalent in the country include corruption, child labour, gender discrimination (including GBV), HIV/AIDS stigmatism, child abuse and early marriage. The report also highlights some of the challenges in relation to labour and working conditions, which are detailed in *Box 6.1*. These issues have the potential to pose a risk to the Project therefore they will be incorporated into and managed via the ProjectCo's Environmental and Social Management Plan (ESMP).

(1) Eric Pelsler, Patrick Burton & Lameck Gondwe (July 2004) Crimes of Need - Results of the Malawi National Crime Victimization Survey. Available at <https://oldsite.issafrica.org/uploads/CRIMES3PUBLIC.PDF> (accessed March 2018)

(2) Eric Pelsler, Patrick Burton & Lameck Gondwe (July 2004) Crimes of Need - Results of the Malawi National Crime Victimization Survey. Available at <https://oldsite.issafrica.org/uploads/CRIMES3PUBLIC.PDF> (accessed March 2018)

(3) US Department of State. Malawi Human Rights Report 2016. Available at <https://www.state.gov/documents/organization/265486.pdf> (accessed March 2018)

Summary of 2016 Human Rights Report Findings in Relation to Labour and Working Conditions

Freedom of Association and the Right to Collective Bargaining: The law allows workers, except for military personnel and police, to form and join trade unions of their choice without previous authorization or excessive requirements. In relation to the formal section, freedom of association and the right to collective bargaining were adequately respected, however informal sector workers organized in the Malawi Union for the Informal Sector (MUFIS) did not have sufficient standing to bargain collectively with employers. According to the *2013 Malawi Labour Force Survey*, of the 7.8 million persons in the working population, 88.7 percent were in the informal sector.

Prohibition of Forced or Compulsory Labour: Although there are fines in place to manage forced labour, the report suggests that children were subjected to domestic servitude and other forms of forced labour, including cattle herding; bonded labour on plantations, particularly on tobacco farms; and menial work in small businesses.

Prohibition of Child Labour and Minimum Age for Employment: The law sets the minimum age for employment at 14, and children between the ages 14 and 18 may not work in hazardous jobs or jobs that interfere with their education. Accordingly, child labour remained a serious and widespread problem and the National Statistics Office (NSO) 2014 *Malawi Millennium Development Goal Endline Survey* found that almost 40 percent of children ages five to 17 were engaged in some form of child labour. This was mainly present on tobacco farms, subsistence farms, and in domestic service. Many boys worked as vendors, and young girls in urban areas often worked outside of their families as domestic servants, receiving low or no wages.

Discrimination with Respect to Employment and Occupation: Discrimination in employment and occupation occurred with respect to gender and disability. Despite the law against discrimination based on gender or marital status, discrimination against women was pervasive, and women did not have opportunities equal to those available to men. Women had significantly lower levels of literacy, education, and formal and non-traditional employment opportunities. Few women participated in the limited formal labour market, and those that did represented only a very small portion of managerial and administrative staff. Households headed by women were overrepresented in the lowest quarter of income distribution.

Acceptable Conditions of Work:

- **Minimum wages:** The minimum wage was 688 MWK (\$0.95) per day as of October 2015. The *2014 Integrated Household Survey* estimated 50.7 percent of citizens lived below the poverty line. There was no exception to the requirement of paying the minimum wage for foreign or migrant workers. Official minimum wages apply only to the formal sector and thus did not apply to most citizens, who earned their livelihood outside the formal wage sector. Wage earners often supplemented their incomes through farming activities. No government programs provided social protections for workers in the informal economy.
- **Working hours:** The maximum legal workweek is 48 hours, with a mandatory weekly 24-hour rest period. The law requires payment for overtime work and prohibits compulsory overtime. The workweek standards were not effectively enforced, and employers frequently violated statutory time restrictions.
- **Occupational health and safety:** Enforcement of health and safety standards was also poor. The law includes extensive occupational health and safety standards, however workers, particularly in industrial jobs, often worked without basic safety clothing and equipment. Workers have the right to remove themselves from dangerous work situations without jeopardy to continued employment.
- **Worker grievances:** Workers dismissed for filing complaints regarding workplace conditions have the right to file a complaint at the labour office or sue the employer for wrongful dismissal; however, due to unfamiliarity of such rights and high levels of unemployment, workers were unlikely to exercise these rights. Additionally, workers were not adequately protected.

Source: Extracted from the *Malawi Human Rights Report 2016*

Child labour is particularly common in rural areas of Malawi due to high levels of poverty. According to the National Child Labour Survey (2015), 47% of children aged 5 to 17 years were reportedly to be involved in economic activities in the last seven days prior to the survey while 52% (2.9 million) of the children were working in the last 12 months ⁽¹⁾.

Figure 6.3 shows the distribution of working children aged 5-7 in Malawi.

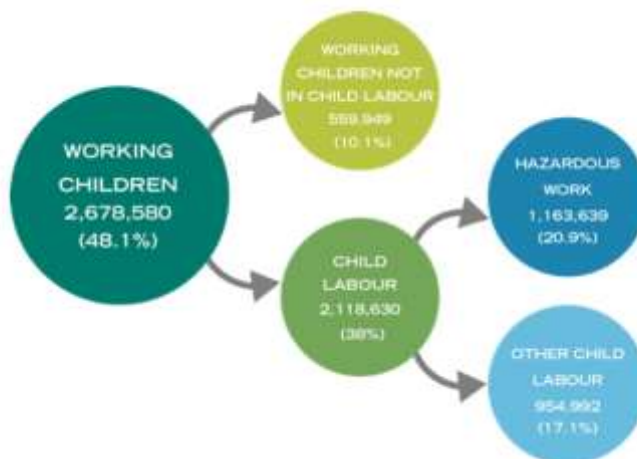


Figure 6.3

Distribution of Working Children Aged 5-17 Years in Malawi

Source: National Child Labour Survey, 2015

As the figure shows, almost 30% of children engaged in child labour are undertaking hazardous work (eg exposure to hazardous chemicals, working in an unsafe environment, long hours, working with dangerous machinery, exposure to sexual abuse, etc). According to the NCLS report, 75% of children in rural areas work in the agriculture, forestry and fishing industry, 2% in wholesale and retail industry, 21% in domestic work with the rest in other industries ⁽²⁾.

6.3.7

Vulnerability

Vulnerability is dependent on the level of resilience of individuals to cope with socio-economic or bio-physical change, or shocks. Resilience is based on having access to the necessary resources (e.g. financial credit, assets such as crops, shelter, etc.) and physical/mental capacity (e.g. strength to relocate, skills to rebuild a business, etc.) to cope and adapt to change in the community. Vulnerable groups are consequently more susceptible to negative projects impacts and are more likely to have a limited ability to take advantage of positive impacts.

(1) International Labour Organisation. National Child Labour Survey, 2015. Available at http://www.ilo.org/ippec/Informationresources/WCMS_IPEC_PUB_29055/lang-en/index.htm (accessed March 2018)

(2) International Labour Organisation. National Child Labour Survey, 2015. Available at http://www.ilo.org/ippec/Informationresources/WCMS_IPEC_PUB_29055/lang-en/index.htm (accessed March 2018)

Local Level

Box 6.2 summarises the vulnerable groups in the Project area.

Box 6.2

Vulnerable Groups

Women and girls: Greater lack of financial capital and influence in decision making than men. They also suffer domestic violence and abuse, creating impacts on health (eg mental disabilities, sexually transmitted diseases and physical constraints), as well as and high rates of teenage pregnancy. This is particularly prevalent in Mayambo Village. Women may also experience discrimination in relation to economic opportunities and other gender related issues in the workplace.

Female headed households: Higher levels of poverty than men due to more pressure balancing domestic and livelihood activities. All the villages have a high proportion of female-headed households.

Unemployed male youth/adult men: Due to financial pressure as their role as the 'bread winner', they are vulnerable to alcoholism and depression. Additionally, the youth are vulnerable to impacts related to labour and working conditions due to lack of education and high levels of poverty.

Subsistence households: There are high levels of poverty and food insecurity throughout Project area, creating significant household pressures and health issues. These households are particularly vulnerable to impacts related to economic displacement.

People over the age of 60: More limited in terms of their physical ability to engage in livelihood and income generating activities. They also endure high levels of poverty due to low levels on income. Additionally, some may require additional care and support.

Children and orphans: Rely on carers to take responsibility for their economic situation and general wellbeing. Due to high levels of poverty in the Project area, children and orphans are vulnerable to child labour.

Generally, all households in the Project area are considered vulnerable resulting from poor food security, low education levels and low levels of income. As such, livelihood restoration planning and implementation resulting from land acquisition by ProjectCo is crucial in order not to exacerbate vulnerability levels; rather to reduce them and enhance positive impacts.

Community Cohesion and Community Networks

Generally Group Villages have close connections with villages within the group. Any disruption to these may impact on relationships and support networks. This includes the potential for in-migration, impacts related to land acquisition access, and restrictions to access affecting the pathway transecting the planned solar site, which have the potential to disrupt these networks.

Women generally have strong ties with other women in their communities and neighbouring communities, as they rely on each other to support with social events, such as weddings and funerals, community development

initiatives and in some cases, economic activities. Men in most villages suggested that they have ties with neighbouring communities, however these are related to economic activities such as sharecropping, trading and maize milling.

Local Level

Table 6.4 shows community networks in those included in the sample of FGDs undertaken with men and women.

Table 6.4 *Community networks in the Project Area*

Village	Women	Men
Kazimbe	Communities include Chiyenda, Mayambo, Kanzimbe II and Jephthara. These villages support each other in community development activities and social gatherings, such as weddings and funerals.	Communities include Chiyenda, Mayambo, and Jephthara. They trade farm produce such as green maize. They also support each other during social events such as funerals.
Mayambo	Communities include Kanzimbe, Chiyenda, and Omenyako. These villages support each other during funerals and other social gatherings as well as for development related issues. Kanzimbe is a few meters away from the village.	Communities include Lifuwu, Namanda, and Mayambo. These villages engage in sharecropping and also take their children to common schools within the area.
Waya	-	Santhe is the main community that the men depend on during social events, such as funerals. They also work together on income generating activities such as quarrying and maize milling services.
Santhe	Communities include Waya, Mtolo and Kanzimbe. These villages hold functions such as wedding celebrations and funerals together. They also work together. They are a few metres away from each other	
Sadzu	Communities include Mvunguti, Elias and Malumbira and Cheratoni. These villages have joint social functions such as weddings and funerals. They also engage in income generating activities together including trading, as well as share water points. The communities live within walking distance to each other.	The men do not have any strong connections but source casual labour for their farms from Kanzimbe and vice versa.

Education System

National and District Level

As shown in Figure 6.4 Malawi has an 8-4-4 education system, which is organized around eight years of primary school, four years of secondary school and four years of tertiary education ⁽¹⁾.

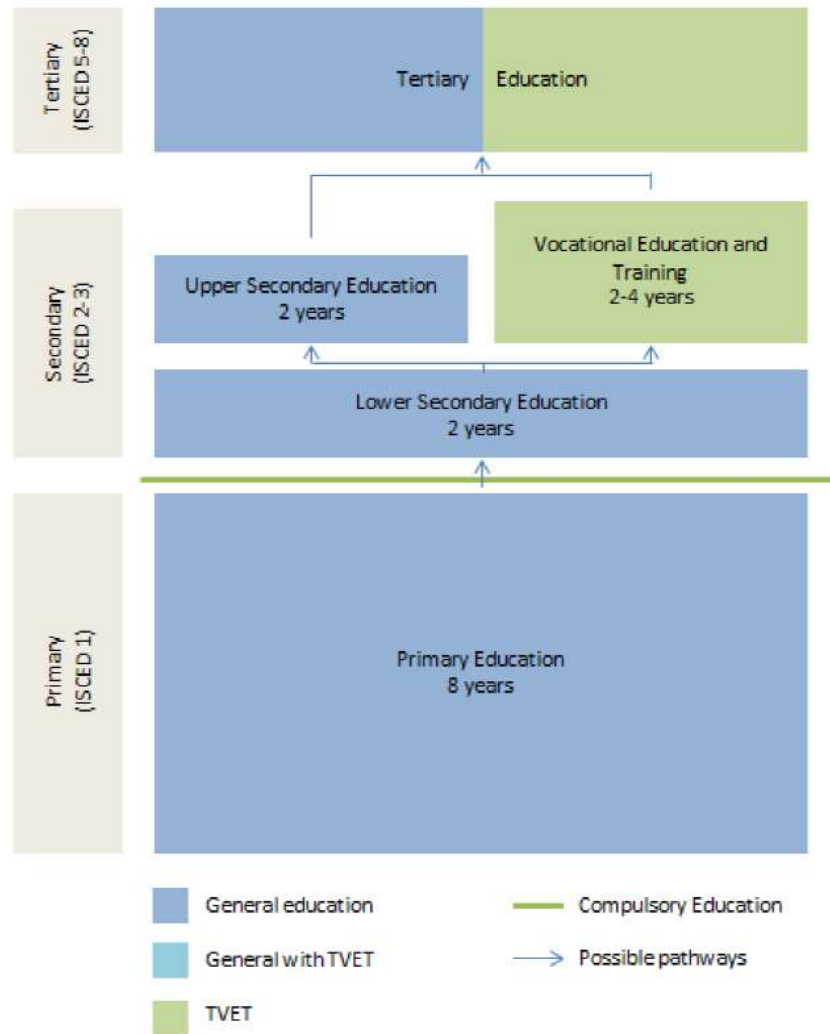


Figure 6.4 Education System (Source: UNESCO-UNEVOC)

There are many technical colleges and training centres throughout Malawi. This is partly because a branch of the national government, the Technical, Entrepreneurial and Vocational Training Authority (TEVTA) is mandated to promote and facilitate such training in order to promote the country's

(1) UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training (August 2012). Available at http://www.unevoc.unesco.org/wtdb/worldtvtdatabase_mwi_en.pdf (accessed March 2018)

economic growth ⁽¹⁾. Additionally, there are three main universities in Malawi, including the Catholic University, Mzuzu University, and the University of Malawi.

Access to Education

District Level

Salima is divided into seven education zones namely: Thavite, Matenje, Kaphatenga, Msalura, Katerera, Ngolowindo and Chipoka. At the time of the Salima District Socio-Economic Profile (2006) (SDSEP), there were 58 junior primary schools, 65 primary schools, two conventional secondary schools, 13 approved community day secondary schools (CDSS) and two private secondary schools in the district ⁽²⁾.

The 2006, total enrolment for primary education in Salima was 77,957; 51% females. There were also 779 teachers in the district of which 773 are qualified and 40% female. According to SDSEP, 61% of all pupils travel for more than one hour to get to school ⁽³⁾. In relation to secondary education, the 2006 enrolment rate shows disparities between males and females; there were 2,818 pupils at secondary schools in the district of which 46% were females ⁽⁴⁾.

Local Level

Within the Project area the main primary schools are Namanda and Mbwezera. Children in Sadzu also go to Makande, situated approximately 2 km from the village. For secondary education, students in Mayambo and Waya access Kaphirimtiwa Secondary School. Sadzu has the closest Secondary School to the village, located approximately 4 km away. Salima Technical Collage is over 30 km from all the villages in the Project area See *Table 6.5* for details.

(1) Education System in Malawi. Available at <http://www.sdn.org.mw/Education2010/Edu-system.html> (accessed March 2018)

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

(3) Salima District Assembly. Salima Socio-Economic Profile 2006

(4) Salima District Assembly. Salima Socio-Economic Profile 2006

Table 6.5 Access to Education

Village	Education Facility	Approx. Distance from the Village
Kanzimbe	Pre-school at Nazarene Church	1 km
	Namanda Primary School	2 km
	Mbwezera Primary School	3 km
Mayambo	Nazareth pre-school	2 km
	Namanda Primary School	3 km
	Mbwezera Primary School	1.5 km
	Kaphirintiwa Secondary School	7 km
	Salima Technical Collage	35 km
Waya	Mbwezera Primary School	1 km
	Kaphirintiwa Secondary School	7 km
	Salima Secondary School	8 km
	Salima Technical Collage	30 km
Sadzu	Makande Primary School	2 km
	Kaphatenga Secondary School	4 km
	Salima Technical Collage	30 km

Source: ERM Social Surveys, 2018

Namanda School is the oldest primary school in the Project area and was established in 1962. At the time of the social surveys, the school served approximately 1000 children; approximately 550 male and 450 female students, with a reported attendance rate of 90% and 65% respectively. This is reflected in the completion rates where 70% of males complete primary education, compared to 60% of females at the school. At the time of the surveys, 14 teachers working at the school and the main subjects taught included maths, English, Chichewa, life skills (sexual health, puberty etc), science and technology and arts.

Mbwezera School is a new primary school and was established in 2016. There are 21 villages in the catchment area. Reportedly, in 2016, there were a total of 236 students (124 girls and 112 boys) and at the time of the social surveys the number had almost doubled to 528 students. The school has three blocks, each comprising two classes. The school has seven teachers and the children’s ages range from six to 16 years.

In relation to secondary education, according to the SDSEP, there were 84 boys and 53 girls enrolled at Kaphirintiwa Secondary School and 182 and 203 boys and girls respectively enrolled at Salima Secondary School ⁽¹⁾. Even though the gender ratio differs at both schools, overall at the district level, as mentioned above, in 2006 there were less girls than boys enrolled at secondary school (46%) ⁽²⁾.

At Salima Technical Collage the main subject taught include mechanics, carpentry/joinery, brick laying, administration, Information and

(1) Salima District Assembly. Salima Socio-Economic Profile 2006

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

Communications Technology (ICT), business studies, accounting, human resource management and community development. Males comprise 70% of technical courses and 50% of business/administrative courses, with females accounting for the remainder. The enrolment rate for the collage is not available.

Literacy Levels

National and District Level

At the time of the 2006 Population and Housing Census, 76.6% of males and 58.8 females between the ages of 15 to 24 in Malawi were literate ⁽¹⁾. In Salima the 2006 literacy rate was 52%, which is a significant increase from year 2002 when it was 37.8% ⁽²⁾.

Local Level

Household survey data suggests that the literacy rates in Salima reflect those in Kanzimbe and Mayambo in households surveyed. In Kanzimbe, 40% of females and 55% of males surveyed are literate. In Mayambo, a female and males literacy levels are almost equal; 53% and 50% respectively. However, as males are more educated than women in Mayambo, this may not reflect reality. In other villages in the Project area, the reportedly literacy levels are lower. In Sadzu village, 86% of men and 38% of women are literate. In Waya and Santhe Villages, females and males literacy levels are not equal; majority of men in the village are literate with only 10% of women literate.

Low literacy levels are due to limited access to secondary and further education from teenage pregnancy, financial constraints to pay for uniform and materials, as well as distance and lack of access more generally.

6.3.9 Economy and Livelihoods

Economic Context

National and District Level

Malawi has low human development and is ranked 170 out of 185 ⁽³⁾ on the human development index, which measures average achievements in key dimensions of human development: a long and healthy life, being knowledgeable and have a decent standard of living.

In 2016 Malawi had a per-capita Gross National Income (GNI) of 320 US dollar , one of the lowest in the world ⁽⁴⁾. Over past decades, the country's

(1) Malawi Statistics, 2017. Available at <https://knoema.com/MWMS2011/malawi-statistics-2015?region=1002270-salima&indicator=1003360-literacy-rate> (accessed November 2015)

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

(3) UNDP Human Development Index, 2018. Available at <http://hdr.undp.org/en/countries/profiles/MWI> (accessed March 2018)

(4) Malawi Economic Development document- IMF Country Report. July 5, 2017. Available at <https://www.imf.org/en/Publications/CR/Issues/2017/07/05/Malawi-Economic-Development-Documents-45037> (accessed March 2018)

development has been negatively affected by both climate-related disasters and governance challenges.

The economy is predominantly agricultural contributing 28% of Gross Domestic Product (GDP) in 2015. Informal employment is high at 89%, and it is estimated that 52% of the population live below the poverty line. Poverty rates are higher in rural areas relative to urban areas ⁽¹⁾.

In Salima District, the economy is primarily agriculture-based, engaging approximately 93,397 families over 107,377 ha of land ⁽²⁾. The main agricultural activities carried out in the district include crop production, livestock production and marketing of agricultural produce.

Additionally, in 2006, 57.3% of the population in the district population living on MK16,125 per capita /year (\$20) while 25% was living on MK10,029 per capita/ year (\$14) against the national standards of 52.4% and 22% respectively. These figures show that the population in the district is living in severe poverty.

Livelihoods Activities and Household Income

Local Level

Housed surveys suggest that 46% of households in Kanzimbe and 53% of households in Mayambo generate monthly incomes of up to 10,000 MWK (\$14). Only 28% of households in Kanzimbe and 28% of households in Mayambo report incomes of between 10,000 and 20,000 MWK (\$27.55). Lastly, 28% of households in Kanzimbe and 18% of households in Mayambo report incomes above 30,000 MWK (\$41). From income generated, between 20% and 27% of households reported income from selling their crop production. A small number of households are also engaged in selling livestock produce, tree products, trading and other activities (including bicycle taxis). Additionally, provision of agricultural labour through 'Ganyu' is also a source of income for households. Ganyu Labour is described in *Box 6.3* below.

(1) Government of Republic of Malawi (2017) Health Sector Strategic Plan II, 2017-2022. Available at <http://www.health.gov.mw/index.php/policies-strategies?download=47:hssp-ii-final> (accessed March 2018)

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

Ganyu labour practices are rooted in cooperative labour practices traditionally undertaken in Central Africa. It includes participation by individuals and families in shared labour, predominantly during times of peak activity in labour-intensive work, such as land-clearance, land-preparation, and harvesting.

The social surveys identified *ganyu* labour as a significant factor in household livelihoods strategies. Men are actively involved in *ganyu* labour however, women and children also participate. Women portrayed involvement by men in a generally negative manner focusing on the withdrawal of crucial labour from the household and the limited income from earnings during protracted absences from home.

Women stated that *“ganyu is the most common activity. Most families work either on other people’s farms to earn a little income which is mainly used for household need or their own farms. Men go off to work on some estates (rice) as well.”*

The women attributed this to: *“the fact that (agricultural) inputs are expensive, the men in the village opt to leave behind other programs (i.e. when someone comes to train them on good land management practices) in order to go out and do other works which will bring them cash for buying the farm inputs.”*

The practice of selling labour is deeply ingrained in the social structure of Malawi’s rural communities. Payment has traditionally taken the form of mutual labour, shared harvests or most typically a reward of a prepared meal or brewed beer. Socio-economic change and increased mobility, has led to changes in the manner in which labour is exchanged with travelling considerable distances to perform labour in exchange for wages. *Ganyu* is an important source of supplementary income during the hunger period when agricultural reserves are exhausted and there is no significant production.

Studies have attributed rural poverty in Malawi in part to the negative impact of *ganyu* on livelihoods pointing to labour shortages and poor production in communities where the practice is prevalent.

Source: ERM CSR Feasibility Studies Report, May 2018

Many households in Kanzimbe and Mayambo have no sources of cash income at all and rely on subsistence farming; 47% of households surveyed in Kanzimbe and 43% in Mayambo.

The major sources of income in Sadzu, Santhe and Waya include farming, charcoal burning, small businesses such people selling tomatoes, vegetables, small cakes and charcoal production. There are labour sharing groups with their neighbours as farm labours to earn a living. These includes seasonal work such as land preparation, planting and harvesting of crops such as cotton and groundnuts.

Further detail on land-based livelihoods is provided in the following section.

6.3.10

Land Ownership and Use

Land Ownership System

National and District Level

Malawi's 1965 Land Act and the 2002 Land Policy recognise three categories of land, namely:

- Public land;
- Private land; and
- Customary land.

In rural areas, Malawi predominantly has a customary land ownership system whereby chief administer land on behalf of the government. In Salima District, chiefs have the mandate to distribute land to individuals in the Traditional Authority as well as address land disputes and report to the government through the office of the District Commissioner.

Approximately 78% of the land in Salima District is under customary land tenure system ⁽¹⁾. Land is mainly used for subsistence farming since most of the people who own the land have some sizeable plots ⁽²⁾. The remaining land is privately or publicly owned; 18% and 4% respectively. These plots are used for developments, such as agricultural estates, hotels or hospitals etc.

Local Level

Land users in Project area have land allocated under the customary land tenure system, which has generally been inherited. However, due to the land acquisition process undertaken by ProjectCo, some farmers in Kanzimbe and Mayambo have already been compensated and have moved to alternative areas within the Kanzimbe Group Village. Alternative land will be identified for those impacted by Phase II of the land acquisition process as part of the LRP.

Generally, there are few conflicts resulting regarding land. However, land disputes that do arise are resolved through the GVH and TA.

Land Use

District Level

More than 75% of land in Salima is used for production of maize, pulses, ground nuts, cotton, cassava, sorghum, sweet potatoes, mangoes and bananas ⁽³⁾.

(1) Salima District Assembly. Salima Socio-Economic Profile 2006

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

(3) Salima District Assembly. Salima Socio-Economic Profile 2006

Local Level

Land in the Project area itself is generally flat and predominantly used for farming purposes. Common crops cultivated in the Project area include maize, cotton, cowpea, groundnuts, beans, soya, rice, vegetables and tobacco. Trees on the land include fruit and forest trees such as mango, masawu, winter thorn and baobab trees, for example. Local communities also rear livestock such as cattle, goat and pigs, and grazing is a common activity on and around the Project site.

Agriculture

Local Level

Women in Kanzimbe reported that of the common crops described above, maize, groundnuts and vegetables were primarily grown for household consumption while soya, rice, cowpea and cotton were for sale. The same crops are grown in Mayambo; however cowpea and groundnuts are the main crops sold.

High levels of subsistence farming across the Project area reflects the low levels of income and high levels of poverty in the villages.

There are a number of challenges associated with agriculture. Pest infestation such as fall armyworms, aphids and cutworm and diseases such as blight (a type of fungus) are common.

Food shortages are common in the communities in the Project area. Women in Kanzimbe stated that shortages are associated with late rains, drought and long dry seasons, soil erosion, insects and pest resistance to eradication efforts had been resulting in declining harvests, and extending hunger seasons. They identified the lack of farm inputs, labour scarcity, water issues and erratic rainfall, poor soil management and the lack of improved seed as key issues. Other challenges that affect productivity include lack of agricultural extension services, lack of mechanised technology, lack of capital, dependence on inorganic inputs and misuse of resources. These challenges are most felt during the key hunger months of December, January and February.

Notably, access to markets was not listed as a limitation. Limited surplus tomatoes and winter maize grown in the *dimbas* are mainly sold at the Kanzimbe Trading Centre but at times at Dowa and Lilongwe; cotton is sold to dealers in the Balaka district. Men from Kanzimbe grow maize and groundnuts for household consumption and cotton to sell to the Great Lakes Cotton Company.

Utilisation of Natural Resources / Forest Products

Local Level

Hunting of bush meat and timber extraction in the form of firewood for domestic consumption, sale, and charcoal production, and sale in local and

regional markets were identified during social surveys as having an important seasonal role, linked to disposable income for the purchase of food.

Livestock

Local Level

The main livestock reared in the Project area include goats, cattle, pigs and chickens for subsistence. Livestock are mainly kept for income generation and for household consumption.

6.3.11 Health

Healthcare System and Access to Healthcare

National and District Level

Malawi has a three-tier health care delivery system based on three levels of health care, which include Primary, District and Tertiary healthcare, as described in *Box 6.4* ⁽¹⁾ below.

Box 6.4 Healthcare System in Malawi

- **Primary health care or community care:** Consists of community initiatives, health posts, dispensaries, maternity units, health centres and community and rural hospitals.
- **District hospitals** constitute the secondary level of health care: Provide specialised services to patients referred from the primary health care level, through outpatient and inpatient services and community health services. These services are enhanced by provision of adequate specialised supportive services, such as laboratory, diagnostic, blood bank, rehabilitation and physiotherapy services.
- **Tertiary health care:** Consists of highly specialised services and provided by central hospitals and other specialist hospitals providing care for specific disease conditions or specific groups of patients.

Source: Africa Health Observatory, 2018

Malawi's Ministry of Health is responsible for healthcare in Malawi, and the majority of services are provided by the Government with Christian Health Association of Malawi (CHAM) providing a large proportion of services in rural areas. The Ministry of Health recognises the role of traditional healers in the delivery of health services. As such, a Traditional Medicine Policy has been developed to guide the practice of traditional medicine in the country ⁽²⁾.

At the time of the SSEP there were health facilities included one hospital, 12 health centres, four dispensaries and 59 outreach clinics. The facilities were run by the Ministry of Health and Population (MOHP), Christian Hospital

(1) Africa Health Observatory. Malawi. Available at http://www.who.int/profiles_information/index.php/Malawi:Service_delivery_-_The_Health_System (accessed July 2018)

(2) Africa Health Observatory. Malawi. Available at http://www.who.int/profiles_information/index.php/Malawi:Service_delivery_-_The_Health_System (accessed July 2018)

Association of Malawi (CHAM), Salima Islamic Association, and some public and private institutions ⁽¹⁾ .

The SSEP suggests that Salima District Hospital district hospital serves more than 50,000 people. The hospital provides preventive, curative, rehabilitative and support services to peripheral health units. Facilities include a major surgery unit, dental surgery, labour ward, x-ray, laboratory and voluntary counselling and testing rooms (for HIV testing and support). Furthermore, the hospital also provides out-patient services for the urban population and the surrounding villages.

Local Level

Katawa Health Clinic is the nearest health centre to all the villages in the Project area and Salima District Hospital is the nearest emergency facility. The distance to the facilities are provided in *Table 6.6* below.

Table 6.6 *Distance to Healthcare Facilities*

Village	Distance to Katawa Health Clinic (km)	Distance to Salima District Hospital (km)
Kanzimbe	1	15
Mayambo	2	15
Waya	1.5	9
Sadzu	4	8

Source: ERM social surveys, 2018

Katawa Health Clinic is an NGO-run facility which caters for 12,000 people across 110 villages. Services available at the clinic include an outpatients care, anti-retroviral therapy for HIV, family planning, youth friendly health services, outreach services, nutrition and provision of water treatment. Although the Katawa Health Clinic can provide basic services it is in need of a maternal health unit and renovation. Pregnant women are currently required to travel to Salima District Hospital to access maternal care, which requires walking long distances or transportation costs.

Health Prevalence Rates

National and District Level

Table 6.7 provides an overview of the World Health Organisation (WHO) health indicators for Malawi ⁽²⁾. As the table shows, the average life expectancy for men is 61 and 67 for women. This is in line with other countries in the region, but low compared to the rest of the world. Malaria is the most common cause of death among children under the age of 5 (14% of

(1) Salima District Assembly. Salima Socio-Economic Profile 2006

(2) World Health Organisation 2018. Available at <http://www.who.int/countries/mwi/en/> and <http://www.who.int/gho/countries/mwi.pdf?ua=1> (accessed March 2018)

causes in 2013). Additionally, HIV/AIDS is the leading cause of death among adults (27% of the total causes in 2012) ⁽¹⁾.

Table 6.7 *WHO Health Indicators for Malawi*

Indicator	Statistic
Life expectancy at birth m/f (years, 2016)	61 / 67
Under-five mortality rate (per 1000 live births (2013)	68
Maternal mortality ratio (per 100 000 live births) (2013)	510
Deaths due to HIV/AIDS (per 100 000 population) (2013)	256.6
Deaths due to malaria (per 100 000 population) (2012)	59.6
Deaths due to tuberculosis among HIV-negative people (per 100 000 population) (2013)	9.3

Source: World Health Organisation, 2015

Although the above figures are poor, the health situation is improving due to investment in the health sector and the government's and NGO's aim to achieve related Sustainable Development Goals (SDGs).

The SSEP states that the 10 major diseases in the district are HIV/AIDS, respiratory infection, malaria, diarrhoea, anaemia, malnutrition, meningitis, tuberculosis, obstetric complications, and skin conditions. Of these diseases, the leading causes of hospitalisation in the district for all patients are malaria, upper respiratory infection, anaemia and HIV/AIDS related conditions. For the children under the age of five, malaria, pneumonia and anaemia are main diseases leading to hospitalisation ⁽²⁾. The SSEP recognise that HIV/AIDS is a serious 'pandemic', and various prevention programmes are being carried out in the district to raise awareness and promote behavioural change.

Local Level

At the time of the social surveys, Katawa Health Clinic reported that the top health issues among women and men are malaria, Sexually Transmitted Diseases (STI's) and hypertension. For children, the top three were malaria, diarrhoea and malnutrition. The number of cases of malaria and diarrhoea almost double during the rainy season as they mainly result from poor hygiene and sanitation in villages.

As with Katawa Health Centre, communities in the Project area reported malaria as the most common illness resulting from lack of nets. They suggested that malaria is most prevalent during the rainy season.

Table 6.8 provides an overview of perceived health issues among men and women in the Project area.

(1) World Health Organisation 2018. Available at <http://www.who.int/countries/mwi/en/> and <http://www.who.int/gho/countries/mwi.pdf?ua=1> (accessed March 2018)

(2) Salima District Assembly. Salima Socio-Economic Profile 2006

Table 6.8 Perceived Health Issues

Village	Health Issues Perceived by Women	Health Issues Perceived by Men
Kanzimbe	<ol style="list-style-type: none"> 1. Malaria due to the lack of mosquito nets. This increases due to the rainy season. 2. Cervical cancer (this is unlikely but it was reported in the FGD) 3. Vomiting blood (reason unknown) 	<ol style="list-style-type: none"> 1. Malaria 2. Stomach-ache and diarrhoea problems 3. Some cases of STIs
Mayambo	<ol style="list-style-type: none"> 1. Malaria 2. Flue/Cold 3. Backache 	-
Waya	-	-
Santhe	<ol style="list-style-type: none"> 1. Maternal related problems,(neonatal and delivery services) and family planning like tubulisation. 2. Malaria 	-
Sadzu	-	<ol style="list-style-type: none"> 1. STIs 2. Malaria 3. Cholera

Source: ERM social surveys, 2018

In Kanzimbe, women reported cervical cancer as the second most common health issue, however this is unlikely and is potentially referring to STI's. Men also suggested that they contract STI's from unprotected sex. Stomach-ache/ diarrhoea is also common due to poor sanitation and reportedly from eating green maize during the hunger period.

Women in Mayambo reported that they get flu/colds caused by the smoke from the charcoal burner or firewood. They suggested that backache was also common due to their workload, especially during farming season.

In Santhe and Sadzu both the men and women said that malaria is high in the villages because they are situated close to Lilongwe River and they do not have access to mosquito nets for protection. Women in Santhe also complained that they experience maternal complications as the local clinic does not have a maternal unit. In Sadzu men reported the top health issue amongst them to be due to unprotected sex. Additionally, cholera is common during the rainy season due to poor hygiene.

Women were most open about sexual health during social surveys and said that a number of forms of contraception are available, including the contraceptive implant, pill and condoms. Although condoms are available at the Clinic, the men suggested that they are not commonly used and men do not like to ask for them. As such, as well as STIs, unwanted pregnancies are common.

6.3.12

Public Infrastructure and Services

Water Sources

Local Level

The two villages each have one borehole and a hand pump (Figure 6.5) as their main sources of potable water supply. People in the village's report that the available water is of good quality and taste. The communities also feel that they are not affected by water related ailments ⁽¹⁾.

In Waya, the village has three boreholes for the supply of potable water. However, these boreholes have low water yield which consequently result in more time spent at the water points. Sadzu Village has four boreholes for the supply of potable water. However, the current water supply does not meet the population demands.

In Santhe, the village has two boreholes. Access to safe water for drinking is good such that almost all of the village have access to it without any struggle. Clean water is available and accessible at all the times of the year.



Borehole in Kanzimbe Village



Borehole in Mayambo Village

Figure 6.5

Boreholes in Kanzimbe and Mayambo Villages Source: ERM social surveys, 2018

Regardless of the reliable water supply provided by the pumps, they do not fully meet the demands of the population and women reported that it can take two to four hours fetch water. This is a significant factor that creates time

(1) It should be noted that although boreholes with hand pumps usually provide good quality water to the communities, the water might contain harmful chemicals such as fluoride and arsenic but this can only be determined through water analysis.

poverty for women. For example time that they could use for income generating and other activities.

There are water point committees in the villages which were established before the borehole were provided. The role of these committees is to ensure the villages have access to water by servicing and repairing the water points. These committees receive contributions from all the members of the community.

In terms of irrigation, households in Kanzimbe mainly use water from rivers/streams and use rain fed harvesting.

Sanitation

Local Level

In all the villages in the Project area, the households generally have a private latrine, with few sharing. However, the communities reported that they are constructed from mud or concrete slabs, and can collapse during the rainy season. According to the social surveys, the pit latrines are used for an average period of one to two years. Once the pit latrines are full, they are closed, filled with soil and abandoned, and new latrines are built. However, in some cases, the latrines collapse during the rainy season. During this time households share with their neighbours or use the bush. *Figure 6.6* shows examples of latrines in the Project area.



Figure 6.6

Latrines in Kanzimbe and Mayambo Villages Source: ERM social surveys, January 2018

Latrines are typically built generally close to the houses so they are safe to use and are easily accessible for both women and children.

All the villages have a water committee, or a water and sanitation committee, as summarised in *Box 6.5*.

Water Committees in Kanzimbe and Mayambo were established during the installation of boreholes. In Kanzimbe, the borehole was donated by a local politician in 1998. In Mayambo, the borehole was installed in 2015 by a non-governmental organisation called Assemblies of God. Both committees comprise a chair, secretary, treasurer, and community members. Kanzimbe Water Committee comprises two men and four women, while Mayambo comprises 10 members with an equal gender distribution.

The committees are generally responsible for:

- Maintaining the boreholes. The members have been trained how to fix basic faults;
- Collecting monthly contributions from the community for parts and other maintenance costs; and
- Coordinating villagers for monthly cleaning works at the borehole.

Other than managing the borehole, the water committee is responsible for encouraging the community to maintain high levels of sanitation and hygiene in the villages. However, the main challenge reported by both communities is cooperation from community members to pay their monthly contribution. This can cause delays getting boreholes fixed as and when an issue arises.

In Sadzu and Santhe Village Sanitation Committees are responsible for ensuring all households have pit latrines and are observing good hygiene standards.

Energy Sources

Lighting

The main source of lighting in households in the Project area is torchlight as they are not connected to the national grid. It was reported that the use of battery torches is very expensive. Other sources of lighting include solar home systems and solar lanterns. With the compensation from Phase I land acquisition for the Project, some households have invested in small solar home kits. Additionally, some small business in Kanzimbe Trading Centre use solar for light and power.

Cooking

Firewood is the most common source of energy used for cooking by households surveyed during both the wet and dry seasons. Charcoal is the secondary source of energy. Charcoal is used more in the wet season than in dry season, possibly because it is a dry fuel source. Kerosene is only used in the wet season to burn firewood.

Women cook in confined brick kitchens where these sources of energy can have serious health implications for women and the young children that stay close to their mothers (Additionally, the stoves used by almost all households surveyed are inefficient (in terms of wood/charcoal usage).

Traffic and Transportation

Local Level

Transport infrastructure near the Project site is limited to the national highway that runs from Lilongwe to Salima. This road is paved and has a single lane in

each direction. The remainder of the roads in the Project area are asphalt, gravel and dirt roads. These roads are impassable during the rainy season communities struggle to access basic amenities such as health care and schools.

The main means of transport in communities is walking, bicycles, cars and motorcycle.

Waste

Local Level

Waste generated in the Project area includes food waste. The majority of the households have their own waste disposal pits (all waste). However, in Kanzimbe, Mayambo, Santhe and Waya there are still some people who do not have their own waste disposal pit and either dispose of waste using their neighbour's facility or throw the trash anywhere. In Sadzu, the sanitation committee encourages the community to have their own waste disposal pits.

6.3.13 *Development Priorities and Community Needs*

During social surveys, Village Heads, women and men were asked about their community needs and priorities that would enable a better quality of life and higher standard of living. The key priorities raised were increased access to boreholes/ water to accommodate the population in villages, improved access to health services (in particular maternal care), and improved access to education.

The priorities raised and detailed in *Table 6.9* below, have been considered in the development of mitigation measures and the LRP that will be developed for the Project.

Table 6.9 Community Development Priorities

Village	Village Head	Women	Men	Justification for Priorities
Kanzimbe	<ol style="list-style-type: none"> Loans for businesses and financial literacy training. Good potable water and sanitation facilities. Improved access to quality healthcare, including well trained health workers, electricity and a maternity wing. 	<ol style="list-style-type: none"> Improved access to water. Health centre. Money/ capital. 	<ol style="list-style-type: none"> Improved access to water for drinking and irrigation. Improved access to secondary education and education on farming techniques. Electricity. 	<ul style="list-style-type: none"> One borehole is not enough to accommodate the village and does not allow for irrigation of crops. There is also no back up when it breaks down. Loans/access to finance would allow women and the broader community to start a business (eg in livestock farming, maize mills etc). Health facilities require improvement and better access to maternal care. Electricity would support access to water pumping, improve education and health care (eg preserving drugs). Education facilities would improve access to jobs and income.
Mayambo	<ol style="list-style-type: none"> Health facility Water (borehole) Irrigation agriculture 	<ol style="list-style-type: none"> Access to business loans and opportunities. Access to irrigation 3. Improved health services. 	<ol style="list-style-type: none"> Improved water and sanitation . Education. Agriculture interventions (irrigation and extension services). 	<ul style="list-style-type: none"> There is a need for improved access to maternal care and to reduce the distance to a health facility. The borehole in the village does not accommodate the population. The Headman suggested that they would like to be connected to solar and have water points installed around the village. Access to irrigation and extension services will help reduce hunger and malnutrition, as well as create crop diversification and improve productivity, to manage increasing erratic rainfall. Access to finance to enhance income generation and start small businesses. Improved water and sanitation would improve health in the village. There needs to be a reduction in distance to educational facilities.

Village	Village Head	Women	Men	Justification for Priorities
Waya	<ol style="list-style-type: none"> 1. Secondary school. 2. Nursery. 3. Road. 	-	<ol style="list-style-type: none"> 1. Agricultural support 2. Improved access to healthcare. 3. Improved access to education. 	<ul style="list-style-type: none"> • There is no secondary school with or nearby villages. A school is required to reduce the distance that children have to walk. • There is no nursery school and children lack good foundation for primary school. • There are no direct roads that connects the village to the main markets. • The village has to share a borehole and requires one of their own. • Improved healthcare is required to improve the ability to work and generate income. Additionally the community requires access to a broader range of services. • Improved agricultural productivity is required to improve income generation.
Santhe	-	<ol style="list-style-type: none"> 1. Improved access to education. 2. Improved access to healthcare. 3. Electricity. 	-	<ul style="list-style-type: none"> • Improved access to education is required to enable better choices in life and to be successful. • Improved health is required to work and the community required improved access to services in the village. • Electricity enables improved economic opportunities.
Sadzu	<ol style="list-style-type: none"> 1. More boreholes. 2. Health centre. 3. More blocks at the school. 	<ol style="list-style-type: none"> 1. Water. 2. Improved access to healthcare. 3. Improved access to education 	<ol style="list-style-type: none"> 1. Farming equipment. 2. Improved healthcare. 3. Improved education facilities. 	<ul style="list-style-type: none"> • Access to water is a challenge because there are not enough boreholes to accommodate the population. • Katawa Clinic does not provide all the services needed for the community (eg maternal care) and travel to the district is expensive due to transportation costs. • The children learn under trees and when it begins to rain the children are just sent back home. Additionally, there is a need to reduce the distance to secondary school and add classroom to accommodate the number of students. • Farmers lack equipment to support agricultural productivity that enables improved living standards.

NGO Support Received in Villages in the Project Area

Villages in the Project area have received support from a number of NGOs operating in Salima to support with development activities, as detailed in Box 6.6.

Box 6.6

NGO Support in Villages

Kanzimbe - Total Land Care (TLC) worked in the village for approximately five years, including providing a solar panel to support irrigation farming. Malawi Lake Basin (MLB) also worked in the village to support an irrigation project. Malawi Interfaith AIDS Association (MIA) is working in the village for the past four years in relation to women's and children's rights. Additionally, Kindle Orphan Outreach (KOO) supported the developed of a health centre.

Mayambo - A government Farm Input Subsidy (FIS) was operating in the village to support farming activities for vulnerable farmers, however this has not been successful. Additionally, Assemblies of God (AoG) installed a borehole for the community in 2017.

Waya - Received support from Feed the Children (FtC) to focus on nutrition and child health. Additionally, KOO has supported orphans in the village. In relation to agriculture, TLC and MLB have focused on the protection of trees and agricultural development support respectively. TLC also provided fuel efficient cookstoves.

Sadzu - KOO have supported orphans in the village and Save the Children (StC) have also been active in the village.

Community Based Organisations (CBOs)

There are a number of community based organisation villages in the Project area. These include village development committees (VDCs), Village Savings and Loans (VSLs) and self-help groups.

Village Development Committees

At the District, TA, and at village level there are development committees:

- District Development Committee (DDC) - comprises district departments who make the overall decision regarding development projects;
- Area Development Committee (ADC) - comprises TAs and other senior representatives that report development needs to the DDC; and
- Village Development Committee (VDC) - comprises the GVH and senior community representatives, including elders and women, who report development needs to the ADC.

The VDC and ADC result from government decentralisation structures to ensure that there is a bottom up approach to achieving community development goals.

At the village level, VDCs are responsible for identifying developmental needs of the community and coordinating development activities. The churches and mosques in these areas support and encourage participation in these developments. In Sadzu, the committee encourages people to take part in activities such as the construction of roads and the moulding of bricks to support local schools. However, this is not the case in Waya as there is no development committee that is religiously affiliated the existing committee has gradually become less effective.

Kanzimbe Group Village Community Policing

The committee comprises 10 male members drawn from KGV, including Mayambo, Kanzimbe, Dzoole, Mbezela, Chenda, Nanjoka and Sikweya.

The role of community police is to:

- ensure mutual respect between communities;
- protect the communities from harm; and
- maintain law and order.

The community police have received training from the Malawi Police Service.

Village Savings and Loans / Finance Related

There are Village Savings and Loans (VSL) committees in the communities which enable men and women to save income and invest in small businesses.

Womens Groups

Mayambo and Sadzu have active womens' 'Kitchen Top Up Groups', that collectively finance the purchase of kitchen utensils (eg pots, spoons and buckets), as well as meetings to discuss nutrition and hygiene. These groups empower women by teaching them cooking skills and promoting good hygiene habits. Similar groups exist within Santhe and Waya Village, however, very few women partake in them. These women prefer the women's guild groups in their churches, which have similar objectives.

Other groups

Sadzu has a youth association called the 'Katawa Youth Club', which engages in recreation and promotion of sexual reproductive health in the village.

6.3.14

Cultural Heritage

National Level

Malawi has two UNESCO World Heritage Sites, namely Lake Malawi National Park and Chongoni Rock Art Area. Lake Malawi falls within Salima District but it is over 24 km from the Project and is therefore not impacted.

Local Level

Reportedly, whilst there are churches in the villages there are no religious buildings directly on the Project site

In Mayambo Village the community graveyard is located at the edge of the village. In Kanzimbe village there are two gravesites:Kanzimbe 1 and Kanzimbe 2. The graves in Waya and Santhe are located approximately 500 m northeast of the village.The graves for Sadzu Village are located within the community.

Kanzimbe has a traditional dancing shrine, however like the churches, it is not situated directly on the site. Men in Sadzu and Waya do not have any traditional groups and participate in the traditional masquerade dance (Gale Wankulu).

For women, there are cultural groups within the villages that initiate girls into womanhood after the onset of their menstrual cycle.

7.1 INTRODUCTION

Stakeholder engagement is a two-way process of communication between the developer and stakeholders that may be impacted by the Project, influence Project decisions, or have a specific interest in the Project (e.g. non-governmental organisations) or academic institutions).

Stakeholder engagement for the Project has been undertaken in line with the IFC Performance Standards, based on the key objectives of stakeholder outlined in *Box 7.1*.

Box 7.1 Guiding Principles of Stakeholder Engagement

Ensuring understanding: Provide an inclusive and transparent process of culturally appropriate engagement and communication to ensure that stakeholders are well informed about the planned project.

Build relationships: Through supporting open dialogue, engagement will help establish and maintain a productive relationship between the developed and project affected communities, as well as other key stakeholders.

Facilitate participation: Ensure that all stakeholders participate in decision making regarding the project, regardless of gender, age, ethnicity, status and other socio-economic factors so that they are not adversely impacted and access project benefits.

Engage vulnerable groups: Identify and engage vulnerable groups to enable equal access to project information and a platform for them voice their concerns so that specific measures are included in project design.

Manage expectations: It is important to ensure that the planned project does not create or allow unrealistic expectations to develop amongst stakeholders about potential benefits, such as employment or compensation. The engagement process will serve as a mechanism for understanding and managing expectations by disseminating the correct information in an accessible way.

Ensure compliance: The process is designed to ensure compliance with both local regulatory requirements and international best practice.

Facilitate free, prior and informed consultation: Ensure engagement is free of external manipulation or coercion or intimidation, undertaken in a timely way so that stakeholders are informed prior to the development or implementation of the project, and ensure information is presented in an understandable and accessible way with consideration for literacy and language.

In order to facilitate the stakeholder engagement process for the Project, a Stakeholder Engagement Plan (SEP) has been developed, which provides a detailed engagement framework to minimise social risk, and to enhance relationships between the developer and Project affected communities. The SEP is a 'live' document and will be updated as the Project progress.

7.2 NATIONAL AND INTERNATIONAL REQUIREMENTS

This section provides details of national legislative requirements and international best practice standards, namely the International Finance Corporation (IFC) Performance Standards and Equator Principles.

7.3 NATIONAL REQUIREMENTS

The main stakeholder engagement requirements for development projects are detailed in the Environmental Management Act, 1996 ⁽¹⁾. It states that an Environment Impact Assessment (EIS) should be developed in accordance with the requirements set out in the Act. The requirements include the following engagement activities:

“The EIA shall be open for public inspection provided that no except for the purposes of civil proceedings brought under this Act or under any written relating to the protection and management of the environment or the conservation or sustainable utilization of natural resources.

The Director shall invite written or oral comments from the public thereon, and where necessary may –

- conduct public hearings at such place or places as the Director deems necessary for purposes of assessing public opinion thereon;*
- require the developer to redesign the project or to do such other thing as the Director considers desirable taking into account all the relevant environmental concerns highlighted in the environmental impact assessment report, any comments made by the public and the need to achieve the objectives of this Act...”*

Additionally, following legislation shown in Box 7.2 applies in relation to land acquisition, which includes notices to be placed in the *Gazette*.

(1) The Government of Malawi, Environmental Management Act 1996. Available at <https://www.malawilii.org/mw/legislation/act/1996/6> (Accessed November 2017)

- *Land Act, 2016*: The Act is the principal act with respect to land administration and management in Malawi and for all matters relating to land such as land tenure, land transfer, land use and compensation. The Act vests all land in the Republic in perpetuity. The Act has two categories of land, which are public land and private land. Section 7(2) classifies Public land as Government land and unallocated customary land while Section 7(3) classifies private land as freehold, leasehold or customary estate.
- *Electricity Act, 2004*: Notice needs to be published in the *Gazette* or in a paper in general circulation. Notices should include the nature of the work and the name and location of the project. Notice will also be provided to the affected person.
- *Land Acquisition Act, 2016*: The Lands Acquisition (Amendment) Act 2016 empowers the Minister to acquire land in the interest of Malawians.
- *The Customary Land Act, 2016*: Customary land is the land occupied and used by members of a community who live under customary law. Customary land, however, is not communal land. Most customary land is divided into pieces allocated for the use of individuals and their families. Rights to this land are usually well defined, often for exclusive use and transmissible.

In the case that the Minister intends to transfer customary land for public interest, this is announced in the *Gazette* and sent to the land committee containing the details of the land to be transferred. Contradictory to the Land Acquisition Act, the Minister shall give 90 days' notice for the transfer. However it should be noted that the land acquired for the Project was private land and therefore this requirement does not apply.

Other requirements that need to be observed by the Project are grounded in the Constitution of Republic of Malawi (1995) which focuses on human rights and participation of various groups in society such as women, children and the disabled that may be vulnerable to Project impacts. As such vulnerable groups will require specific measures to ensure they are included in stakeholder engagement activities.

7.4 INTERNATIONAL REQUIREMENTS

This section outlines international best practice requirements stipulated by the IFC and Equator Principles to align stakeholder engagement activities with International Finance Institution (IFI) requirements.

7.4.1 IFC Performance Standards

The IFC defines the objective of stakeholder engagement as being “*the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts*” ⁽¹⁾.

(1) IFC Performance Standard 1: Environmental and Social Risks and Impacts. Available at http://www.ifc.org/wps/wcm/connect/115482804a0255db96fbffd1a5d13d27/PS_English_2012_Full-Documents.pdf?MOD=AJPERES (accessed November 2017)

The IFC Performance Standards include specific guidance on conducting stakeholder engagement both during the planning phase as well as throughout the project lifecycle. Stakeholder engagement requirements are contained in *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*, as summarised in Box 7.3.

Box 7.3

Performance Standards Requirements for Stakeholder Engagement

IFC PS1: Assessment and Management of Environmental and Social Risks and Impacts:

Stakeholder engagement is an on-going process that requires stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and on-going reporting to Affected Stakeholders.

Disclosure of relevant project information: Provide affected stakeholders with access to relevant information on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such stakeholders and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.

Informed Consultation and Participation (ICP): ICP involves a deep exchange of views and information to inform process decision-making and understand the views of the affected stakeholders on matters that affect them directly, including proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

All consultation should be documented and stakeholders should be informed about how their concerns have been considered.

External Communications: Implement and maintain a procedure for external communications that includes methods to receive and track communications from the public, assess the issues raised and determine how to address them, provide and document responses and adjust the management program. Additionally, clients are encouraged to make publicly available periodic reports on their environmental and social sustainability.

Grievance Mechanism for Affected Stakeholders: Establish a grievance mechanism to receive and facilitate resolution of affected stakeholders' concerns and grievances about the client's environmental and social performance.

On-going Reporting to Affected Stakeholders: Provide periodic reports to the affected stakeholders that describes project progress, on-going risk to or impacts on affected stakeholders, and issues related to the consultation process or grievance mechanism. Consultation and disclosure must continue throughout the life cycle (construction and operation phase) of the project.

Source: IFC Performance Standard 1, January 2012.

7.5

STAKEHOLDER IDENTIFICATION AND MAPPING

A stakeholder is defined in the IFC Performance Standards as:

“Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders,

civil society organizations and groups with special interests, the academic community, or other businesses” (1).

The purpose of the stakeholder identification process is therefore to establish which organisations and individuals, including vulnerable groups, may be directly or indirectly affected (positively or negatively) by the Project or have an interest in it.

Stakeholder identification takes into account:

- The expected AoI of the Project, that is the geographical area over which it may cause impacts (both positive and negative) over its lifetime, and therefore the localities within which people and businesses could be affected;
- The nature of the impacts that could arise and therefore the types of government bodies, Nongovernmental Organisations (NGOs), academic and research institutions and other bodies that may have an interest in these issues.

The aim of stakeholder mapping is to understand the stakeholders’ needs and expectations for engagement and consultation in order to tailor engagement to each type of stakeholder. Stakeholders should be categorised and mapped according to their influence, impact and influence on the Project.

A list of stakeholders identified to date based on the above methodology, is provided in *Table 7.1*. This list is not exhaustive and will be updated as the Project progresses.

(1) IFC (2007) Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets Available at: http://www.ifc.org/wps/wcm/connect/938f1a0048855805beacfe6a6515bb18/IFC_Stakeholder_Engagement.pdf?MOD=AJPERES (Accessed March 2018)

Table 7.1 Project Stakeholders

Stakeholder Category	Stakeholder	Connection to the Project
National Regulatory Bodies - National bodies are of primary importance in terms of establishing policy, granting permits and other approvals for the Project and monitoring enforcing compliance.	Environmental Affairs Department (EAD)	The Project has to comply with the Environmental and Social Impact Assessment (ESIA) requirements and to develop environmental management and monitoring plans. The Department is responsible for issuing the Environmental Certificate after an ESIA has been approved
	Electricity Supply Corporation (ESCOM)	ESCOM are responsible for the wheeling and distribution of electricity to the consumers. If the affected communities are to benefit from the electricity by way of community investment, ESCOM may have to play a part in the modalities for household connections. Additionally the Project can draw on ESCOM's experience in relation to land acquisition for electricity related projects.
	Department of Lands	The ministry (through the Department of Lands) is a key stakeholder in the Project due to the management of land issues in Malawi. The department is the final approving authority for approving land acquisition related matters. It represents the Ministry of Lands, Housing and Urban Development on all matters to do with compensation and resettlement. As such the department has the authority to issue land leases/ registration certificate to ProjectCo. The Ministry also provides land and housing management services to the general public. It draws its mandate from various statutes and policy instruments such as the land acts.
	Electricity Generation Company of Malawi (EGENCO)	EGENCO are currently the sole generators of electricity in Malawi. The contribution of the Project to the alleviation energy problems will greatly assist EGENCO.
	Malawi Energy Regulatory Authority (MERA)	MERA is the overall regulatory authority for energy in Malawi.

Stakeholder category	Stakeholder	Connection to the Project
National Government Ministries	Ministry of Gender and Social Welfare (MoGSW)	MoGSW has an interest in the social welfare of the people throughout the country. Therefore, they will be interested in how the Project is managing impacts on vulnerable groups, including women.
	Ministry of Education, Science and Technology (MoEST)	MoEST will be interested in any access related constraints resulting from the Project as well as any skills training and education related community investment that the Project may engage in.
	Local Government and Rural Development (LGRD)	LGRD is that the administration is the link between the Project and the communities' communication and consultation shall be done through the Malawian authority.
	Finance, Economic Planning and Development Department (FEPDD)	Formulates economic fiscal policy and manage financial material resources for the Government for Malawi in order to realise balanced and sustainable economic growth to reduce poverty.
	Natural Resources, Energy and Mining Department (NREMD)	The ministry is there to ensure sustainable development, management and utilisation of energy, minerals; and monitoring geo-hazards for socio economic development.
	District Commissioner (DC)	The DC is the overarching local authority for all the development projects being implemented in the district. He is also the authority to issue the Project planning Permit (on behalf of the Department of Physical Planning). Additionally, the DC oversees the compensation process for all projects within the District, including payment of compensation and monitoring activities. The DC's office works hand in hand with the Community Development Officer on matters related to social aspects including community mobilisation and sensitisation on such projects.
	Ministry of Irrigation and Water Development/ Water Department MoIWD)	The Water Department is responsible for provision of water supply services including piped rural water supply schemes and boreholes. The Department will need to be engaged in relation to water use for the project and any water related CSR projects resulting from the Project. . A water abstraction permit will be required from the Water Resources Authority if the Project requires a borehole or abstraction of surface water for construction purposes.
	Ministry of Labour (MoL)	The MoL issues the Workplace Registration Certificate as mandated by the Occupational Safety Health and Welfare Act. It is also responsible for monitoring of workers' health and safety during construction and operation.
Community level	Project affected communities, including residents in surrounding villages and land users	Households and communities that will be directly or indirectly affected by the proposed project activities. This includes people living in the affected land either by direct land take or by social and environmental impacts.
	Chiefs/Traditional authorities Group Village Heads/Village Heads	Local community leaders act as representatives of their local community. Meetings with Traditional Authorities will follow local practices and be held prior to any wider communication in order to respect the political and social structure.

Vulnerable groups	<p>May include:</p> <ul style="list-style-type: none"> • Women and girls; • Female headed households; • Unemployed male youth/adult men; • Subsistence households; • People over the age of 60; • Orphans. 	Vulnerable groups may be disproportionately affected by the proposed Project by virtue of socio-economic status or physical abilities and are therefore less resilient to change. Groups have been identified based on a vulnerability assessment undertaken on households impacted to date. A further assessment will be undertaken on households affected by additional land acquisition.
Civil society groups	Community based organisations (CBOs) and cooperatives	Organisations that may be impacted by the Project or that the Project can work with on livelihood development activities.
Non-Governmental Organisation(NGO)/Institutions/Academic	Includes international, national and local NGOs covering biodiversity/conservation, human rights, gender and child related issues	NGO and academic institutions are able to influence the success of projects through advocacy and negative media attention. The Project is required to identify and engage relevant NGOs and institutions to keep them informed about the Project. They may also act as a partner in implementing livelihood or community investment programmes.
Commerce and Industry	Local businesses / potential suppliers and contractors	Will be interested in procurement opportunities in relation to the Project. They may also create cumulative impacts. As such, the Project is required to identify industries in the local area and aim to collaborate with them where appropriate.

This Section outlines stakeholder engagement activities that have been carried out to date in support of the Project, and the process required for the ESIA and LRP.

7.6.1 *Stakeholder Engagement Activities Undertaken Prior to the ESIA*

Stakeholder engagement undertaken in support of the Project so far has primarily been related Phase I of the land acquisition process, and was undertaken by the Salima District Commissioner. However, other engagement has been in relation to the LACS and CSR studies, as mentioned in *Section 1.5* (Project activities carried out to date) above, and included in the following. A summary of the meetings held and key points raised that are considered in the ESIA and land acquisition process for additional land required by the Project (Phase II of land acquisition) are included in *Annex D*.

Initial Engagement

Initial engagement involved meeting Regional and District Lands Officers to gather information on the land acquisition and compensation process in Malawi, and in relation to the Project. Additionally, meetings were held with community leaders and representatives of compensation beneficiaries. A summary of meetings held and feedback from stakeholders is included in *Annex D*.

Social Baseline Engagement for LACS and CSR Studies

As part of the data gathering process for LACS, communities and stakeholders were provided with an overview of the Project and asked if they had heard about it previously. Additionally, information was gathered regarding perceptions on potential Project impacts.

Most stakeholders met during the social surveys reported that they had heard about the Project; however mainly from people that had received compensation from loss of land.

Women in Kanzimbe had incorrectly understood that the Project is being undertaken to supply power in the village resulting from the current lack of ESCOM power/ electricity, when it will be supplied directly to the national grid. In Mayambo, women said that they had been informed about the Project by the government. Men in Kanzimbe and Mayambo stated that they felt they had a good understanding of the Project and mainly heard about it through land valuers. The teacher at Namanda Primary School stated that information regarding the Project had been informally communicated and that they did not have sufficient understanding of the Project.

A summary of the key issues raised is provided in *Annex D*. This feedback has informed the initial scoping of potential impacts that have been considered in the ESIA.

7.6.2 ESIA and LRP Stakeholder Engagement Process

In order to avoid stakeholder fatigue there are three main stages of engagement that form the ESIA and LRP process. These include engaging on the draft scoping report, which incorporates feedback already captured, as well as presenting the Project and gathering feedback from additional communities in the social AoI. Additionally, a third stage of engagement will be undertaken on the draft ESIA/LRP or LRP/ disclosure, which will include consultation on the impacts and associated mitigation identified. Engagement for the ESIA process is presented in *Figure 7.1* below.

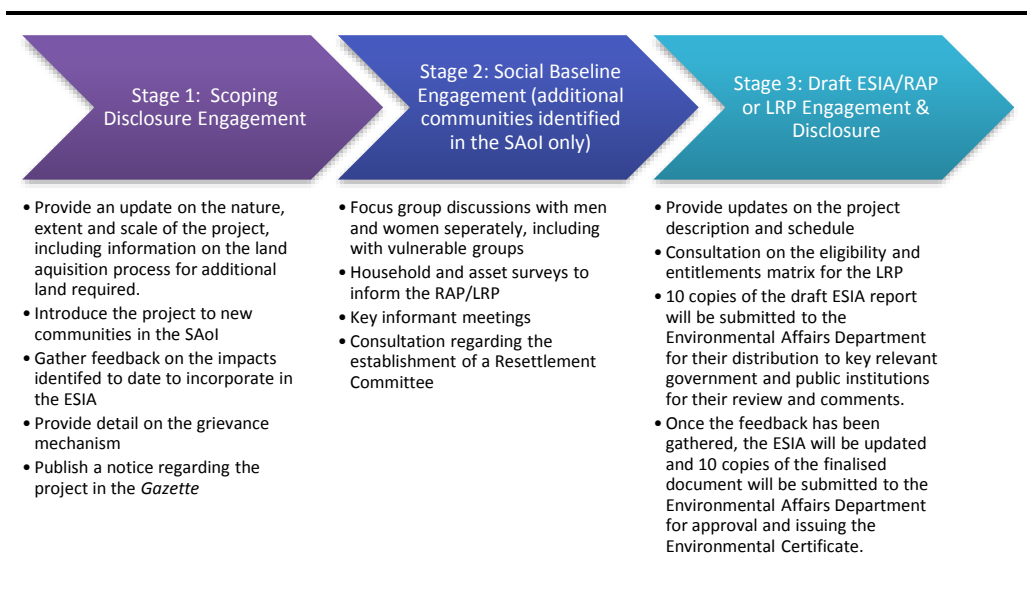


Figure 7.1 ESIA and /LRP Engagement

Stage 1 and 2 of the engagement process has been undertaken and details regarding these are provided below. At the time of writing the ESIA, Stage 3 was pending.

Stages 1 and 2: Scoping Disclosure Engagement, and Social Baseline Engagement – Activities and Outcomes

Stage 1 of the engagement process was carried out between the 23rd and the 27th of April 2018, and Stage 2 carried out between 29th May to 02 June 2018. Stage 1 included meeting with national, district, and local level stakeholders, building on from engagement that has already been undertaken in support of the Project.

Engagement materials developed for this stage of engagement included the following;

- Background information document in English and Chichewa to provide a high level overview of the Project, impacts and contact details for comments/grievances to be submitted;
- Flyers for the meeting in Chichewa were posted in affected communities.
- A pictorial community presentation that illustrated the Project footprint, potential impacts, ESIA and land acquisition process, and provided contact details for comments/grievances to be submitted;
- A technical presentation for the government, NGOs, and other stakeholders; and
- A question and answer guide (Q&A) for community meeting facilitators.

All meetings were documented, including meeting registration, photos and meeting minutes. Additionally, feedback on the meeting process was gathered where appropriate using meeting feedback forms and verbally.

Box 7.4

Meeting Feedback Questions

- | |
|--|
| <ul style="list-style-type: none"> • Was the meeting useful? • Was the information presented in a clear manner and do you feel that you have a good understanding of the Project activities and plans? • Were you able to ask the questions you wanted? • Was this meeting organised in a way to facilitate your attendance? |
|--|

Information gathered from the feedback process will help to inform the organisation of future engagements and support monitoring and evaluation requirements, as detailed in the SEP.

Details of the activities and outcomes for this stage of engagement are provided below and the all stakeholder engagement materials and meeting minutes for Stage 1 of engagement are provided in *Annex D*.

National and District Level Engagement

Using the materials described above the Project team arranged and met with the key government departments that play a role in the Project, for approvals or to provide feedback to feed into the ESIA.

A summary of the engagement and photos of the meetings are provided in *Annex D*.

Community Level Engagement

In addition to national and district meetings, meetings were also held with communities covering a number of villages in the Project area. The purpose of the meetings was to provide a more in depth description of the Project that they had received previously, explain the ESIA process, explain some of the key impacts identified during the scoping process and gather feedback to feed into the ESIA. A total of three community meetings were held, representing affected people surrounding the Project Site and along the transmission line wayleave.

Table 7.2 shows the meetings held in each community and the demographics of each meeting. As the figures show, women were well represented in all the meetings held.

Table 7.2 *Community Meetings*

Date	Location	Villages Represented	Females	Males	Total
24 April 2018	Kanzimbe	Kanzimbe, Kanzimbe 2, Menyako, Maiezi, Mputeni, Jephytala, Malezi	45	40	85
25 April 2018	Mayambo	Mayambo, Njoka, Kanthiti, Chishasha, Kachepela	44	46	100
26 April 2018	Nanjoka	Waya 1, Santhe, Motolo, Sadzu, Malezi, Thangani, Mwape, Malumbula, Michembo, Vonguti, Kuso, Chiwaka	74	54	128
Total			163	140	313

In addition to community meetings, Stage 2 of engagement involved undertaking focus group discussions and key informant interviews were undertaken to gather gender and topic related information. A full list of meetings is provided in Annex D. The outcomes and Project response from all the meetings and photos are also included in *Annex D*.

7.6.3 *Grievance Mechanism*

An effective grievance mechanism allows stakeholders to lodge complaints and/or concerns at no cost, without retribution and with the assurance of a timely response. As part of previous engagement processes, ProjectCo is in the process of establishing a formal grievance mechanism and a grievance committee to enable an accessible and transparent reporting system.

The process will include the following steps:

- Identification;
- Review and record the grievance;
- Acknowledgement;
- Develop a response;
- Communicate response and establish agreement; and
- Close-out process.

A detailed description of the grievance mechanism required for the Project is provided in the Project SEP.

7.6.4 *Monitoring and Reporting*

In order to assess the effectiveness of the SEP and associated engagement activities, ProjectCo will implement a data management and monitoring process as part of the overall monitoring of ESIA commitments and performance.

All engagement activities, throughout the ESIA, LRP and the life of the Project, will be documented and filed in order to track and refer to records when required and ensure delivery of commitments made to stakeholders. The strategies for documenting and recording ongoing stakeholder engagement are detailed in the SEP.

8.1 GENERATION OF ELECTRICITY

8.1.1 Introduction

This assessment identifies the positive impacts that will occur during the operational phase from the generation of electricity.

8.1.2 Summary of Baseline

Malawi has an installed generation capacity of 363 MW, however there is large reliance on large hydropower. Over 95% of Malawi's electricity is generated from hydropower with the Shire River as the main source. Due to drought and low rainfall electricity generation has been reduced by up to 40% due to dwindling water levels. However, in Malawi there is also high potential for solar energy development.

In addition, the lack of electricity at a household level means that people continue to use wood and charcoal for cooking, which contributes to deforestation across the Country and poor indoor air quality and associated health effects.

8.1.3 Potential Impact: Operation

The Project will generate up to 60 MW of power which will be fed into the national grid for distribution in the Central Region of Malawi. The increased power supply from the facility will enable ESCOM to store additional hydro reserves during the day so that it can be manage the peak demand more efficiently in the evening. It will also reduce the dependency on emergency diesel powered emergency generation sets, which will lower cost to the end consumer and reduce the impact on climate change.

8.1.4 Assessment of Impacts: Operation

The increased power supply to the national grid through the operation of the solar PV facility will be a direct, positive impact. The extent of the impact will be regional, as the power generated by the PV facility will supplement the electricity supply to the Central region of Malawi. The duration of the impact will be long-term, throughout the operation phase, and the Project will boost the national power pool by 60 MW (20%) increase in national generation.

Given the need for additional power supply to the national grid, as described above, the sensitivity of receptors is considered high.

The overall significance of the generation of electricity is rated as *Positive* (Table 8.1).

Table 8.1 *Impact Assessment: Operational Generation of Electricity*

Impact	Increase in national generation capacity				
Impact Nature	Negative	Positive	Neutral		
	The generation of electricity is a positive impact.				
Impact Type	Direct	Indirect	Induced		
	It is direct impact as electricity will be fed directly into the national grid				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact will be experienced for the duration of the Project.				
Impact Extent	Local	Regional	International		
	The impact extent is regional as the power from the Project will supplement the regional power supply.				
Frequency	The generation of electricity will be constant throughout the lifetime of the Project. To note that solar technically is not considered base load generation, however the generation is broadly expected to be constant.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered positive.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	N/A				
Impact Significance	Considering the magnitude the potential impact <i>positive</i> significance.				

8.1.5 *Enhancement Measures*

The distribution of electricity in Malawi falls under the ambit of ESCOM. As the Project cannot determine the distribution of power there are no further measures are recommended.

8.1.6 *Residual Impacts*

The residual impact of increased power supply for the Malawian national grid during operational phase will remain a *Positive* impact (Table 8.2).

Table 8.2 *Residual Impact of Generation of Electricity*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Generation of electricity	Operation	Positive	Positive

8.2 *IMPACT ON EMPLOYMENT AND THE ECONOMY*

8.2.1 *Introduction*

This assessment identifies the positive impacts that will occur during the construction and operational phases as a result of employment and 3rd party services required for the construction and operation of the Project.

8.2.2

Summary of Baseline Conditions

In the villages, women are generally responsible for childcare, farming, domestic responsibilities (cooking and cleaning), caring for the sick, gathering and pounding maize meal. Men primarily engage in income generating activities, such as bicycle taxis, selling farm produce or other grocery items and fish trading. Men in Santhe and Waya Village, however, do not partake in fishing activities as they are far from the main fishing villages.

Additionally, *ganyu* labour as a significant factor in household livelihoods strategies. Men are actively involved in *ganyu* labour, with some women also engaging in such agricultural activities. *Ganyu* labour involves families working on other people's farms to earn a little income, which is mainly used for household needs. Men also work for periods on rice estates.

Some of the youth near the planned transmission line also engage in quarrying as there is a site near Nanjoka and Santhe.

In relation to education, student mainly complete up to primary school as access to secondary education is constrained by distance and costs for transportation and uniform. Additionally, girls tend to drop out a secondary level due to teenage pregnancy and early marriage. As such, literacy and skills levels are low.

However, Salima has a technical school, where the main subject taught include mechanics, carpentry/joinery, brick laying, administration, Information and Communications Technology (ICT), business studies, accounting, human resource management and community development. These skills would be useful for some of the jobs required during Project construction.

The economy in Salima is primarily agricultural based, with small and medium enterprises (SMEs) running business in the centre, including guesthouses, printing, mobile services etc.

8.2.3

Potential Impact: Construction and Operation

Approximately 200 workers will be required during the Project construction period including skilled and unskilled workers. However, during operation the number will reduce to approximately 20. The number of workers anticipated to come from local communities has not yet been determined.

Communities in the Project area have poor access to education and in combination with high levels of poverty and traditional behaviours, the population generally has low levels of education and literacy levels. Additionally, the high incidence of teenage pregnancy restricts many young women from accessing the employment market. Regardless of this, the youth,

men and women in local communities have very basic skills to undertake semi and unskilled positions available.

Additionally, there are possibilities to engage local small and medium enterprises (SMEs) in Salima with procurement opportunities.

8.2.4 *Assessment of Impact: Construction and Operation*

Table 8.3 below provides an assessment of potential impacts related to employment and the economy during construction.

Table 8.3 *Employment and the Economy*

Impact	Employment and the Economy					
Impact Nature	Negative		Positive		Neutral	
	Job creation and use of local SMEs for supply of goods and services will create a positive impact on some individuals, households and businesses in the local community and in Salima.					
Impact Type	Direct		Indirect		Induced	
	The impact will directly have a positive affect where individuals that are hired through ProjectCo or the EPC contractor, and an induced impact on local businesses catering for the needs of the workforce.					
Impact Duration	Temporary		Short Term	Long Term	Permanent	
	The impact will only be felt during the construction phase, as the need for workers and goods and services reduces.					
Impact Extent	Local		Regional		International	
	The impact will be felt in some households in local communities and small businesses.					
Frequency	Occasional – the benefits will only be experienced pre and during construction, during periods of recruitment and Project resourcing of goods and services.					
Impact Magnitude	Positive		Negligible	Small	Medium	Large
	The impact will be small-positive as it will enable some individuals, households and businesses to improve their quality of life.					
Resource/ Receptor Vulnerability	Low		Medium		High	
	N/A					
Impact Significance	The impact is positive and it is expected that the impacted will not largely be felt in communities.					

Embedded Controls

ProjectCo are planning to undertake community investment programmes targeting Project affected communities in rural electrification, water and sanitation and agriculture. However, these programmes are yet to be determined. Once implemented, these programmes have the potential to improve access to income generation and the quality of life and standard of living of local communities.

Enhancement Measures

In order to enhance the positive impacts above, the following mitigation measures will be implemented:

- ProjectCo will establish a recruitment strategy for staff required pre and during construction to enable the community to access job opportunities where possible.
- Although recruits will require a basic level of skills prior to recruitment, ProjectCo or the EPC contractor will provide training opportunities and internships to males and females in local communities in order to enhance their skills, increasing employability and career development opportunities at a later stage.
- ProjectCo will source goods and services required for construction and operation in Salima District as much as reasonably possible. Following this, goods and services in Lilongwe and at a national level will be sought prior to sourcing outside of Malawi.
- In addition to the LRP, which will target directly affected communities, ProjectCo will develop and implement a broader gender differentiated Community Investment Strategy (CIS) that will include measures to enhance livelihood, skills capacity and employability in neighbouring communities and surrounding areas. This will be established through a gender focused and participatory needs assessment.
- Preparation of a Gender Development Plan to promote gender equality in relation to job opportunities as well as support the mitigation of gender based violence, and other gender related issues within the workforce and externally (eg in Project affected communities)

Residual Impact Significance

With the mitigation measures included above, the impact significance is expected to be *Positive*.

Table 8.4 *Residual Enhancement: Employment and the Economy*




Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-enhancement)
Employment opportunities and the need for the supply of goods and services has the potential to create jobs for the local community and improve income levels.	Construction	Positive	Positive

A CSR Feasibility study has been commissioned by the ProjectCo and completed by ERM. These programme options were selected by ProjectCo based on community observations and linkages with solar and livelihood restoration requirements resulting from the economic displacement and compensation process, which took place in 2017.

Based on the assessment, it is recommended that the CSR programme includes all three CSR topic areas with a priority on agriculture to address the impacts of land acquisition and current gaps in the way it was implemented against international lender requirements. Programmes are shown in *Table 8.5* below.

A CSR programme will be implemented, however the exact details of the programme are currently being finalised

Table 8.5 Overall CSR Recommendations

Topic Area	Recommended Programme
	Agricultural improvement programme, including: <ul style="list-style-type: none"> • provision of improved crop varieties • improved cropping techniques; • sustainable irrigation and • improved value add techniques.
	Kanzimbe: Construction of an additional solar borehole with taps and upgrade of the existing borehole to a solar pump with taps. Mayambo: Upgrade of the existing pump to solar with four taps.
	Holistic gender focused CLTS programme and support for female friendly sanitation hardware at Namanda Primary School and Kanzimbe Trading Centre
	Subsidised Solar Home Kits for each of the HH in the two communities.
	Solar for public facilities (schools, health centre and Kanzimbe Trading Centre) Eco-friendly fuel efficient stoves in each HH
Other needs	<ul style="list-style-type: none"> • Micro-finance & Small-Medium Enterprise (SME) business training • Adult literacy

9.1 AIR QUALITY

9.1.1 Introduction

The assessment of potential impacts to air quality is limited to the assessment of dust generated during construction from both construction traffic movements and earthworks/construction works (See *Figure 4.2*).

9.1.2 Summary of Baseline

Due to the rural nature of the Project area there are no existing continuous air emissions near the Project site. Occasional air emissions result from burning or clearing activities occur in and around the Project area. There are residential communities within 200 m of the Project site.

9.1.3 Potential Impacts: Construction

Dust emissions will arise during construction from the following activities:

- earth moving activities and ground preparation of the Project site and transmission line wayleave;
- traffic and movement of vehicles over open ground and on unpaved roads; and
- material stockpiles from clearance and preparation activities.

Dust emissions may result in nuisance issues at nearby sensitive receptors due to dust soiling and may result in increases in ambient concentrations of PM₁₀. In addition, dust emissions will arise due to traffic along unpaved roads during the construction.

The vehicles used during the construction of the Project will primarily be Heavy Goods Vehicles (HGVs) associated with bringing in materials and equipment. During construction period the primary Project components will be delivered in the following way:

- inverters - eight truck deliveries;
- main Transformer - two specialised abnormal load deliveries ;
- LV/MV Transformers - Eight truck deliveries;
- PV modules - 200 truck deliveries;
- tracker/structure - 300 truck deliveries; and
- miscellaneous - 200 truck deliveries.

9.1.4

Assessment of Impacts: Construction

The construction of the Project will take approximately 9 months and predominantly occur during the last three months of the wet season February to April and thereafter during the dry season. During the wet season (December to April) the conditions within the Project area are not conducive for dust generation. In addition, emissions will not occur constant over the construction period, rather emissions will peak during site clearance and deliver of panels and mounting structures. Therefore, exposure to dust generating activities and associated dust emissions are likely to primarily occur in the dry season and a short period of the construction phase. Kanzimbe and Mayambo are located within 200 m of the Project site, and Nanjoka is located along the Project access road and these communities will have a high sensitivity. The impact duration will be temporary (over 9 months and primarily during the dry season within this period). The impact magnitude is considered medium.

On this basis, the impact on local ambient air quality due to dust emissions on surrounding receptors is considered to be moderate significance for any receptors within 200 m of the source (*Table 9.1 and Figure 9.1*)

Table 9.1 *Impact Assessment: Air Quality - Dust Emissions during Construction*

Impact	Reduction in air quality during construction activities				
Impact Nature	Negative	Positive	Neutral		
	The potential impacts (dust generation) are negative				
Impact Type	Direct	Indirect	Induced		
	The impact is as a result of the project activities (i.e. construction activities) resulting on an impact on the air quality of the local area.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration is considered to be short term (less than 9 months)				
Impact Extent	Local	Regional	International		
	Air quality impacts may extend beyond the Project's direct AoI, but will remain within 500 m of the Project site.				
Frequency	During the dry season there is the potential for dust on a daily basis, however, this is less likely during the rainy season (December to April).				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered small.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity is considered high due to the small number of sensitive receptors within 200 m of the site (closest being within 20m of the site boundary).				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact is considered to be of moderate significance within 200 m from the Project site and Minor greater than 500m.				

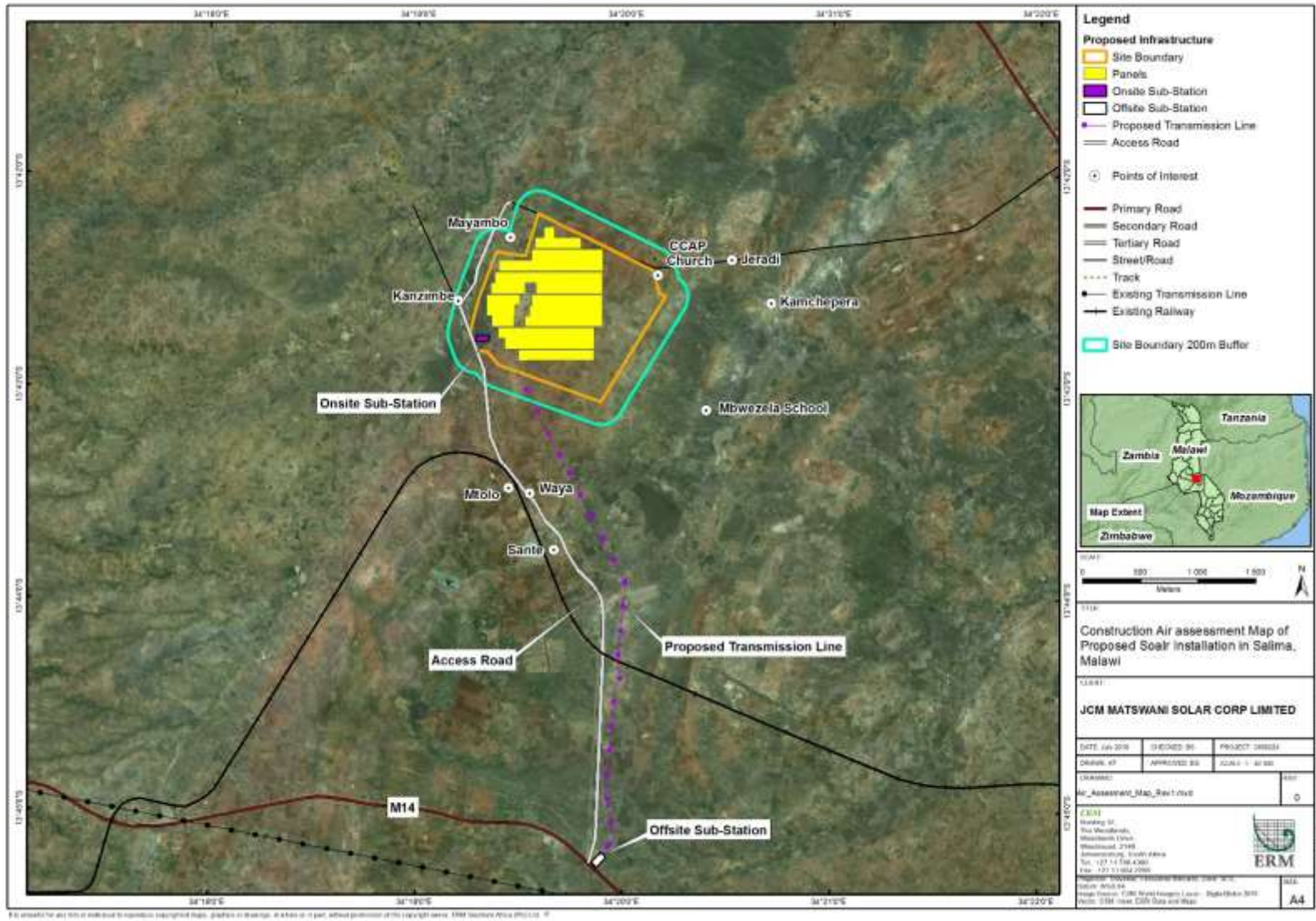


Figure 9.1 Air Quality Assessment Map

9.1.5

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- restrict the removal of vegetation and soil cover to those necessary for the Project;
- land clearance should be sequential and where ground and earthworks are undertaken the smallest possible area for working will be exposed;
- stripping of topsoil will not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt.
- a speed limit of 30 kph on unpaved surfaces to be enforced and the national speed limits on public roads are not to be exceeded;
- all transported materials must be covered with tarpaulins to prevent fugitive dust;
- where feasible, surface binding agents will be used on exposed open earthworks;
- exposed ground and earthworks where wind generated dust occurs, should be covered as much as possible, for example with sheeting, shade cloth or tarpaulin;
- stockpiles stored longer than six weeks should be vegetated or covered (with sheeting, shade cloth or tarpaulin) to reduce soil loss from wind or storm water runoff;
- stockpiles will be located as far away from receptors as possible and will be covered (with sheeting, shade cloth or tarpaulin);
- wind breaks will be erected around the key construction activities and, if possible, in the vicinity of potentially dusty works, to minimise impacts at the nearby temporary residential accommodation and permanent residential receptors;
- all construction vehicles must be regularly maintained to minimise exhaust emissions;
- when not in use, vehicles will be switched off, unless impractical for health and safety reasons (for example, maintenance of air conditioning); and
- any complaints received from neighbours must be reported to the EHS Coordinator or the EPC Contractor through the Grievance Mechanism.

9.1.6 *Residual Impact Significance*

With the application of the mitigation measures during construction, the residual impact is anticipated to be of *minor* significance (Table 9.2).

Table 9.2 *Pre and Post Mitigation: Air Quality Impacts*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Air Quality	Construction	Moderate	Minor

9.2 NOISE

9.2.1 *Introduction*

This assessment identifies the potential impacts on the local acoustic environment which may arise as a result of the Project's noise emissions. Emissions will occur during the construction phase and arise from construction activities (earth moving equipment, welding, traffic) (See Figure 4.2).

9.2.2 *Summary of Baseline*

Due to the rural nature of the Project area there are no existing continuous noise emissions near the Project site. There are residential communities within 200 m of the Project site with closest being within 20m from the Project site.

9.2.3 *Potential Impacts: Construction*

During construction phase the main potential impacts on the acoustic environment are related to the noise emissions from construction machinery and construction vehicles being used for the following:

- *Site preparation*: this includes significant noise-producing activities such as vegetation clearance and minor earthworks. These activities will require heavy construction vehicles and equipment (excavators, dozers, dump trucks).
- *Civil works and installation*: this includes noise-producing activities such as drilling for mounting structure frames, construction of inverter and transformer station foundations and installation of inverter stations, and construction of stores, workshop, and office buildings.
- *Road traffic offsite*: the movement of vehicles for transport of materials and personnel on local roads and/or new access roads close to communities will also generate noise emissions.

All the construction activities mentioned above have the potential to result in an overall increase in the background noise level close to the Project and to potentially disturb occupants at the nearest receptors.

Noise would be generated during the construction phase (and potentially at a lower level during decommissioning). The noise during this phase will generally be of short duration over a total construction period of nine months. Based on UK guidance (BS 5228) if noise levels exceed 65 dB L_{Aeq} at a receptor, the noise this would be predicted to result in significant noise impacts. This assumes that work is carried out during the daytime, and that no noise generating work is required at night.

Traffic associated with construction activities is highly variable through the various stages of construction and depends on the activities taking place. During construction period the primary Project components will be delivered in the following way:

- inverters - eight truck deliveries ;
- main Transformer - two specialised abnormal load deliveries ;
- LV/MV Transformers - Eight truck deliveries;
- PV modules - 200 truck deliveries;
- tracker/structure - 300 truck deliveries; and
- miscellaneous - 200 truck deliveries.

9.2.4

Assessment of Impacts: Construction

Noise impacts from construction activities at the Project site will persist for the construction period and therefore temporary in nature. Emissions will be limited to the AoI and therefore local in nature. Noise emissions associated with construction will be variable in nature and depend on the particular activities being undertaken as well as the number and type of equipment in operation. All construction work and traffic movements will take place during the day therefore there should be no activities with the potential to cause sleep disturbance. In addition, noise emissions will peak during the site preparation and delivery of panels and mounting frames.

The exact location of construction equipment has not been confirmed, but community houses/buildings within approximately 100 m from the nearest construction activities (a backhoe loader with a sound level of up to 84 dB L_{Aeq} at 10 m), a noise level of 67 dB L_{Aeq} will result at the nearest receptor (façade). There are several few houses within 100m of the Project site.

In terms of nearby receptors there are residential communities adjacent to the Project site. The magnitude of the impact is considered small as it will occur over a temporary period and the sensitivity of the receptors are considered high due to the adjacent residential communities within 100 m of the Project site. As a result, the impact significance is *Moderate* prior to mitigation for receptors

within 100m of the Project site. To note, as construction moves from the boundary of the Project site the impact will decrease in significance (*Table 9.3*)

Table 9.3 *Impact Assessment: Noise Emissions as a Result of Construction Activities*

Impact	Impact nearby receptors from Noise Emissions				
Impact Nature	Negative	Positive	Neutral		
	Construction activities may increase noise emissions				
Impact Type	Direct	Indirect	Induced		
	Impacts that result from a direct interaction between the Project and local receptors				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration will be temporary (throughout the construction phase and peaking for a short period within the construction phase)				
Impact Extent	Local	Regional	International		
	Impact limited to the AoI				
Frequency	The frequency is considered to be variable of the construction period				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	As the emissions will only occur for a short period of time and they are medium in nature				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity of the receptors is considered to be high due to the location of residential communities				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the magnitude is small and the sensitivity is high within 100m of the Project site, the impact of noise emissions during construction is considered to be of moderate significance within 100m of the Project site.				

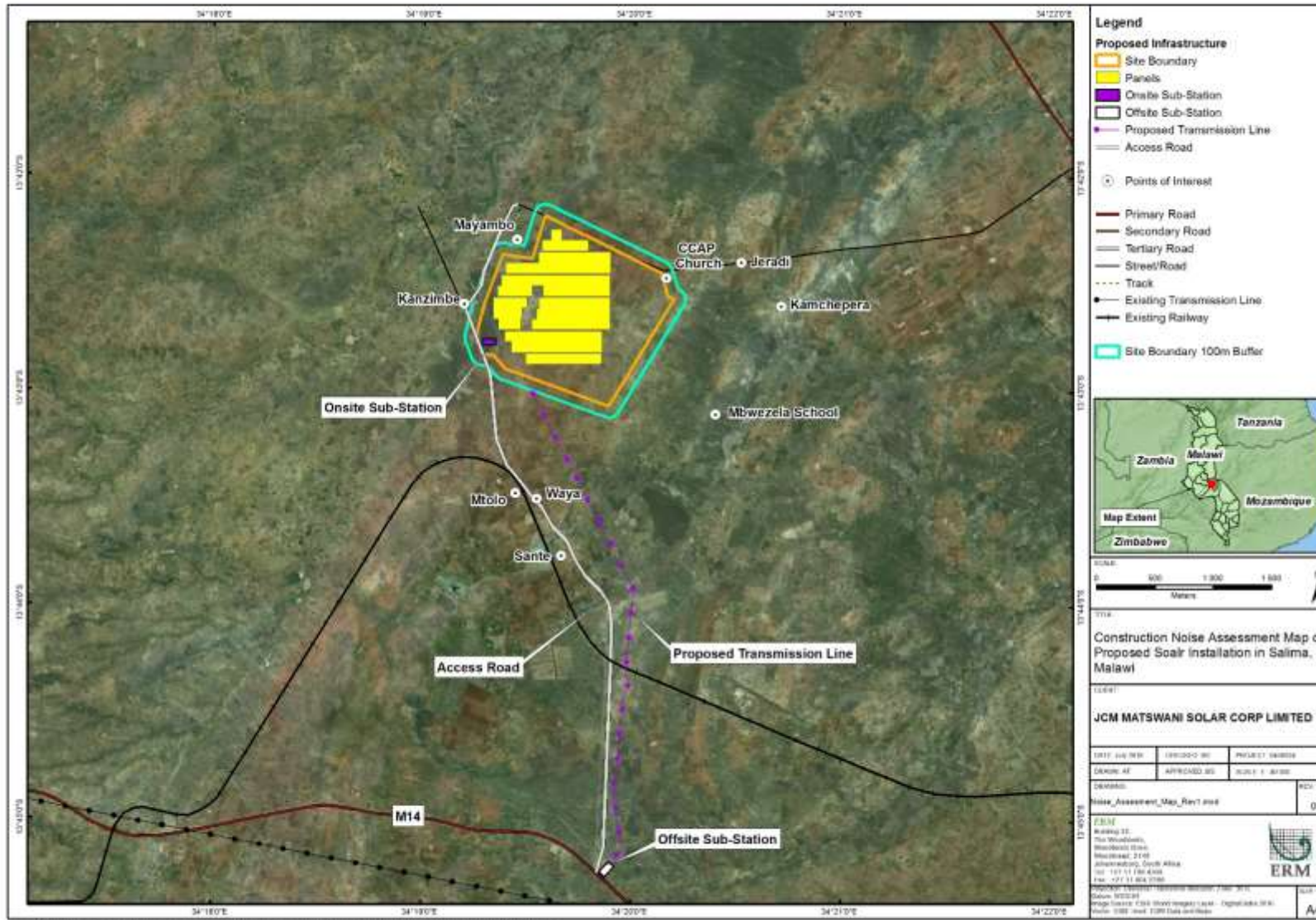


Figure 9.2 Noise Emissions Assessment Map

9.2.5 *Mitigation Measures*

The following mitigation measures will be implemented by the ProjectCo:

- maintain machines and plant equipment in good working condition and inspect regularly;
- selection of equipment and vehicles in accordance with best available techniques for noise reduction;
- minimise vehicle movements within and around the site as much as possible;
- use local screening/site hoardings to screen noise where appropriate; and
- any complaints received from neighbours must be reported to the EHS Coordinator or the EPC Contractor through the Grievance Mechanism.

9.2.6 *Residual Impact Significance*

After the application of mitigation measures the Impact Significance during construction is *Minor* (Table 9.4).

Table 9.4 *Pre and Post Mitigation: Noise Emissions*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impact on nearby receptors Noise emissions (within 100m of the Project site)	Construction	Moderate	Minor

9.3 *SOILS*

9.3.1 *Introduction*

This assessment identifies potential impacts to soil resources resulting from the Project. Impacts will occur during construction as a result Project site and wayleave clearance and preparation (See *Figure 4.2*).

9.3.2 *Summary of Baseline*

Soils vary across the Project site and can be divided into three zones (*Figure 5.8*).

- Zone one comprises of a 0.3 m thick top soil which is very moist, dark grey brown and soft in texture. It is also characteristic of sandy clay with roots. The top soil layer is underlain by an approximately 0.9 m thick

transported layer, which is also moist, grey brown in colour and has a soft to firm texture with sandy clay.

- Zone Two is comprised of a 0.3 m thick topsoil layer which is characteristic of very moist, dark brown and loose. It has silty sand with roots. This layer is underlain by a transported layer which is attributed by moist, brown, loose to medium, clayey sand.
- Zone Three is typical of a 0.3 m thick topsoil layer which is described as very moist, dark grey brown, soft and sandy with clay roots. This layer is underlain by an approximately 0.9 m thick transported layer which is described as very moist, grey brown in colour, firm to stiff in texture with sandy clay.

In addition, the area is heavily reliant on subsistence agriculture.

9.3.3

Potential Impacts: Construction

Site preparation and construction activities will include earthworks and site clearance (including transmission line wayleave). These activities could lead to the following effects on soils resources within and surrounding the Project footprint:

- loss of topsoil;
- soil compaction; and
- soil erosion from wind and water runoff (and sediment release to land and water).

An area of approximately 168 ha of the Project site will be cleared of vegetation and levelled. In addition approximately 12 ha will be cleared for the transmission line wayleave, although a low level of vegetation along the wayleave will be cleared. Compaction and increased erosion from increased exposure of bare ground to wind and water are likely to cause changes in the soil structure and degradation of soil quality. Erosion may occur when surface water flows comes into contact with areas of bare soil, especially on sloped terrain. Raindrops impacting the exposed soil, speeds up surface runoff and the topsoil which binds the soil together for more stability will have been removed resulting in erosion.

Rainstorms during the wet season can increase the potential for erosion. In addition, the compaction of the subsoils through site grading and levelling, and the presence of heavy vehicles and machinery during construction, will result in lower permeability of the soil and therefore decrease infiltration and increase run-off, altering the natural drainage characteristics of the soil. Without appropriate measures, run-off from hardstanding areas, in addition to exposure to wind and rainfall, may increase erosion.

9.3.4 Assessment of Impacts: Construction

Table 9.5 below provides an assessment of impacts related to access restrictions during construction and operation.

Table 9.5 Impact Assessment: Soil Impacts during Construction

Impact	Loss of soil and reduced soil quality				
Impact Nature	Negative	Positive	Neutral		
	The potential impacts are negative.				
Impact Type	Direct	Indirect	Induced		
	The impacts of soil erosion is direct				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impacts are short term, during the construction phase (approximately 9 months).				
Impact Extent	Local	Regional	International		
	Impacts of soil erosion are largely focussed on the Project site and the transmission line wayleave that has been cleared for construction.				
Frequency	The frequency is throughout the construction period with dry season conditions making the soil more prone to wind erosion whilst wet season conditions contribute to physical erosion of cleared land.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is expected to be medium				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The sensitivity of the resource is expected to be medium due to its current use for agriculture and agricultural land use in the Project area, and the low permeability of the clayey soils across the Project site.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact significance is assessed to be <i>Moderate</i>				

9.3.5 Mitigation Measures

In addition, to mitigation measures listed in section 9.1.5, the following mitigation measures will be implemented by the ProjectCo:

- erosion control measures such as intercept drains and toe berms will be constructed where necessary.
- Access roads will be well drained in order to limit soil erosion.

9.3.6 Residual Impact Significance

The residual significance of the impact will be negligible during construction with the implementation of the mitigation measures (Table 9.6).

Table 9.6 Pre and Post Mitigation: Soil Erosion

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Soil Erosion: loss of soil and reduced soil quality	Construction	Moderate	Minor

9.4 *GROUNDWATER RESOURCES*

9.4.1 *Introduction*

This assessment identifies potential impacts to groundwater resources as a result of the Project. Impacts will occur during construction and operations and primarily relates to the use of groundwater resources by the Project (See *Figure 4.2*).

9.4.2 *Summary of Baseline*

The climate of Malawi is tropical continental and largely influenced by Lake Malawi. There are three main seasons: cool and dry, from May to August; warm and dry, from September to November; and warm and wet, from December to April. Climate records recorded at Salima indicate that the months of April to November have significant numbers of days with no precipitation

Groundwater resources within the region of the Project site are associated with the weathered zone above fractured bedrock. The aquifer thicknesses are commonly 10 to 25 m. The aquifer is partly confined by an overlying thickness of 5 to 20 m of tightly compacted clays and soils which have very low permeability. Where groundwater is encountered it is commonly near the base of the clays and under pressure, indicating that it is held within a confined aquifer.

Rural areas in Malawi are highly dependent on groundwater to support their livelihoods. Areas which experience a low stream density groundwater supply plays a leading role in terms of servicing the community domestic needs as well as agriculture. This is the case for communities in the Project area. Data on village wells is not currently available however it is understood that there is a well located in each of the villages of Kanzimbe and Mayambo (*Figure 9.3*). In addition, there are boreholes located in Waya and Sante.

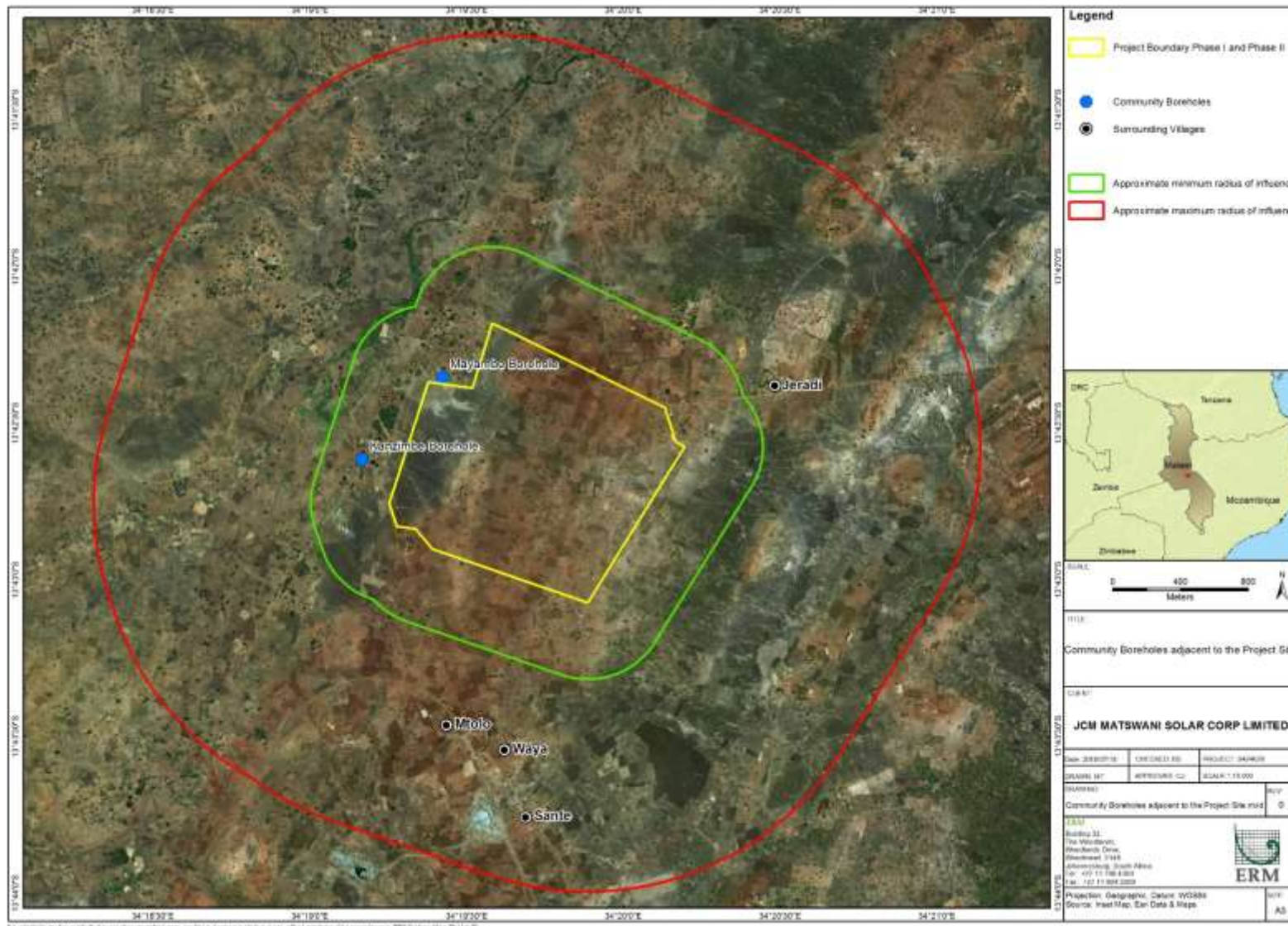


Figure 9.3 Approximate Location of Community Boreholes

9.4.3

Potential Impacts: Construction and Operation

During construction an estimated (maximum) 7,000 m³ of groundwater will be required. This total volume will be required for the 9 months anticipated for construction. This equates to an average abstraction rate of 26 m³/day. The location, number and design of abstraction boreholes will be confirmed during once the EPC contractor has been confirmed. Depending on the final location of the borehole(s) and local aquifer conditions, Project abstractions have the potential to result in a lowering of the water level in community wells in the Kanzimbe and Mayambo villages.

The solar PV power plant will be operated on a 24 hour, 7 days a week basis. Operational activities will include cleaning of the modules by trained personnel using high pressure water hoses with water supplied from the borehole(s) installed during construction. An estimated (maximum) 4,000 m³ per year will be required during operations primarily for cleaning panels. As the climate is seasonally wet and dry, water for cleaning panels is not anticipated to be necessary during the wet season. Consequently, the months where water abstraction is likely to be required is assumed to be from April to November. This therefore equates to an average abstraction rate of 16 m³/day during the dry season. Depending on the final location of the borehole(s) and local aquifer conditions, Project abstractions have the potential to result in a lowering of the water level in community wells in the Kanzimbe and Mayambo villages.

9.4.4

Assessment of Impacts: Construction and Operation

Assuming that the aquifer used in the Kanzimbe and Mayambo community boreholes is connected to the aquifer proposed for the Project abstraction, it is possible that pumping from the Project well may cause the levels of groundwater in the village wells to decline. This is particularly so at the end of the dry season after a long period of low or no recharge of the aquifer and increasing reliance on it for domestic and other uses. As described in *Section 6.3.12* of the Social Baseline, the communities have reported that the water supply in some boreholes does not meet current demands.

No site-specific groundwater data is available on which to base an assessment of potential impacts. In lieu of these, literature data has been used. According to the hydrogeology of Malawi ⁽¹⁾ the site is located on basement aquifer with low to moderate productivity. The Malawian Ministry of Irrigation and Water Development summarise the aquifer characteristics of the weathered basement aquifers as having hydraulic conductivity between 0.5 and 1.5 m/d, transmissivity between 5 and 35 m²/d and storativity of 5x10⁻³ and 1x10⁻² ⁽²⁾.

(1) http://earthwise.bgs.ac.uk/index.php/Hydrogeology_of_Malawi

(2) 2006 data, quoted in Pavelic, P.; Giordano, M.; Keraita, B.; Ramesh, V; Rao, T. (Eds.). 2012. Groundwater availability and use in Sub-Saharan Africa: A review of 15 countries. Colombo, Sri Lanka: International Water Management Institute (IWMI). 274 p.

Applying the above ranges in regional data to the hydrogeological setting within the Project area, the radius of influence of a Project borehole can be estimated as between 450 and 1,680 m via the following relationship:

$$R_0 = \sqrt{\left(2.25 \times T \times \frac{t}{S}\right)}$$

Where R_0 is the radius of influence (m)
 T is the aquifer transmissivity (m²/day)
 t is the time since pumping (day)
 S is the storativity (dimensionless)

The design of the Project borehole(s) is not finalised and hence it is not known how far it will be from any existing groundwater abstraction wells or boreholes. It is probable, however, that it will be located between approximately 500 and 1,000 m from the village wells.

During installation and pump testing of Project boreholes to test to potential viability, the aquifer parameters will be defined in better detail and the radius of influence can be refined. Additionally, monitoring of water levels within village wells will be undertaken to ensure that there is no potential for significant impact to village supplies from Project activities.

The daily volumes to be abstracted for the Project are not large however over 8-9 months of continuous abstraction there could potentially be a lowering of the water table of the order of a few tens of centimetres at a distance of 500 m which may be significant in village wells running dry at the end of the dry season.

Currently, there is insufficient data to assess the effectiveness of these controls since it is hydrogeologically possible that the Project abstractions will be within the radius of influence of and in hydraulic connection with village abstractions. Consequently, applying the precautionary principal until further information is available: with these controls in place, magnitude of the potential impact is small during both the construction and operational phases and the sensitivity of the impacted resource is considered high. The impact significance is therefore *Moderate* (Table 9.7).

Embedded Controls

The following embedded controls will be put in place:

- Monitoring of water levels within existing wells and boreholes will be undertaken during installation drilling and pump testing of Project abstraction boreholes.

- Radius of influence will be recalculated using site-specific hydrogeological parameters. Project abstractions will be located outside the radius of influence if practical.

Table 9.7 *Impact Assessment: Construction and Operation Impacts on Groundwater Resources*

Impact	Impacts on Groundwater Resources				
	Impact Nature	Negative	Positive	Neutral	
	Lowering of the water table within village abstraction wells leading to water shortages for other users.				
Impact Type	Direct	Indirect	Induced		
	Impact as a result of a direct interaction between the Project, i.e. abstraction of water for construction and operational uses.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration is temporary in that it will only occur during the dry seasons, but long term in that it will occur every year for several months and particularly at the end of the dry season.				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI				
Frequency	Every year during construction and operation				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Magnitude of change is considered small with embedded mitigations in place				
Resource/ Receptor Sensitivity/Value/Importance*	Low	Medium	High		
	The sensitivity of the groundwater resources is considered high				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is small and the sensitivity is high, the overall significance is considered to be of moderate significance.				

9.4.5 Mitigation Measures

The embedded controls will need to be enhanced if the Project borehole has to be located within the radius of influence and a response is observed in any village wells during drilling and pump testing of the Project borehole.

The following mitigation measures will be implemented by the ProjectCo:

- a further assessment will be done at a later stage with updated information from all community boreholes;
- continuous monitoring of affected village supplies and a cessation of Project abstraction if the groundwater elevation in village water supply wells reaches a pre-agreed level; and
- water storage solutions (eg tanks) for water pumped during the wet season for use during the dry season.

9.4.6 *Residual Impact Significance*

After the application of mitigation measures the impact significance during construction and operation is *Minor* (Table 9.8)

Table 9.8 *Pre and Post Mitigation: Groundwater Resources*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Impacts on Groundwater Resources	Construction and operations	Moderate	Minor

9.5 *BIODIVERSITY*

9.5.1 *Introduction*

This assessment identifies potential impacts to biodiversity resulting from the Project. Impacts will occur during construction as a result of Project site and wayleave clearance and preparation (See *Figure 4.2*). The following biodiversity impacts have been identified and will be assessed in the sub sections below:

- Loss of Habitats and Fauna Disturbance
- Loss of Threatened Flora
- Risk of Increased Invasive Aline flora
- Disruption of Ecosystem Services

9.5.2 *Loss of Habitats and Fauna Disturbance*

Potential Impacts: Construction

Construction of the proposed Project will require the removal of vegetation and will impact the associated habitats. These habitats have already been transformed from their original state through many years of cultivation and livestock grazing that has led to extensive alteration of ecological processes.

Excavation and compaction of soils may result in loss of habitats for species of mammals, reptiles and amphibians. This may compromise survival of soil-based micro and macro organisms, and reduce the rate of rehabilitation of vegetation.

Summary of Baseline

The habitats on the Project site and the transmission line wayleave qualify as modified based on definitions provided by the IFC PS6. No plant or tree species of high ecological value are expected to be displaced or lost, and these habitats are therefore considered to have a low sensitivity.

The PS6 states that where modified habitats occur, mitigation is required to address impacts to significant biodiversity values, and the client should minimize impacts on such biodiversity and implement mitigation measures as appropriate.

Assessment of Impacts: Construction

Table 9.9 below provides an assessment of impacts related to access restrictions during construction.

Table 9.9 Impact Assessment: Loss of Habitat and Faunal Disturbance

Impact	Loss of Habitat and Faunal Disturbance during construction				
Impact Nature	Negative	Positive	Neutral		
	The loss of habitat is considered negative				
Impact Type	Direct	Indirect	Induced		
	The impact will be the result of a direct interaction between the Project, i.e. construction activities clearance and loss of vegetated habitat.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration will be permanent as lost habitat will not be restored				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI. An area of approximately 175 Ha of habitat plus near vicinity will be affected				
Frequency	Once off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Despite the permanent loss of habitat, the natural vegetation to be cleared is patchy because of the cultivation, and the impact is therefore considered to be of Small magnitude.				
Receptor Sensitivity	Low	Medium	High		
	The habitat is classified as modified, which qualifies for a low sensitivity				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude of change is small and the sensitivity is high, the overall significance is considered to be of Moderate significance.				

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Ensure that vegetation is methodically cleared from the Project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation.
- Planning should be conducted in advance to determine the minimum feasible extent required. Predetermined areas should be clearly demarcated on the ground, fenced where appropriate and enforcement measures taken to avoid footprint creep into surrounding areas.

- Provisions that prohibit staff and contractors from engaging in all forms of hunting in the Project area must be included in the Worker Code of Conduct
- Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation;

Residual Impact Significance

After the application of mitigation measures the Impact Significance during construction is considered to remain *Minor* (Table 9.10).

Table 9.10 *Pre and Post Mitigation: Loss of Habitat and Faunal Disturbance*

Impact	Project Phase	Significance (Pre-mitigation)	Residual (Post-mitigation) Significance
Loss of Habitat and Faunal Disturbance	Construction	Minor	Negligible

9.5.3 *Loss of Threatened Flora*

Potential Impact: Construction

Clearing of vegetation for construction of the Project is likely to result in loss of two locally threatened species, namely *Pterocarpus angolensis* and *Dalbergia melanoxylon*, which occur on the Project site and along the transmission line wayleave. This may contribute to the significant reduction of the population size of these species which is already under threat. Both species are listed as scattered within the Project area, and occurring in moderate numbers along the transmission line route.

Summary of Baseline

These species are listed with a threatened status in Malawi, but are not listed as threatened on the IUCN Red List of Threatened Species. Both species are targeted for their wood, with *Pterocarpus angolensis* targeted for timber for furniture production while *Dalbergia melanoxylon* is targeted for wooden carvings. Old specimens of these trees are becoming increasingly rare, although they are able to reproduce at a younger age and specimens of non-commercial value are frequently sufficiently abundant to ensure the survival of the species.

Assessment of Impacts: Construction

Table 9.11 below provides an assessment of impacts related to access restrictions during construction.

Table 9.11 Impact Assessment: Loss of Locally Threatened Plant Species

Impact	Loss of Habitat and Faunal Disturbance during construction				
Impact Nature	Negative	Positive	Neutral		
	The loss of threatened plant species is considered negative				
Impact Type	Direct	Indirect	Induced		
	Impact will be a result of a direct interaction between the Project, i.e. construction activities clearance and loss of plant species.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration is long term as both plant species are very slow growing				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI - an area of approximately 180 Ha of habitat				
Frequency	One off				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Both species are listed as scattered within the Project area, and occurring in moderate numbers along the transmission line route.				
Receptor Sensitivity	Low	Medium	High		
	The listed species are locally threatened but not at the international scale, therefore it remains a high sensitivity				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude of change is small and the sensitivity is high, the overall significance is considered to be of Moderate significance.				

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation;
- Ensure that vegetation is methodically cleared from the Project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation.
- Planning should be conducted in advance to determine the minimum feasible extent required. Predetermined areas should be clearly demarcated on the ground, fenced where appropriate and enforcement measures taken to avoid footprint creep into surrounding areas.
- Provisions that prohibit workers and contractors from clearing/ utilising word and plant species in the Project Area.

Residual Impact Significance

After the application of mitigation measures the Impact Significance during construction is considered to remain *Minor* (Table 9.14).

Table 9.12 *Pre and Post Mitigation: Loss of Locally Threatened Plant Species*

Impact	Project Phase	Significance (Pre-mitigation)	Residual (Post-mitigation) Significance
Loss of Locally Threatened Plant Species	Construction	Moderate	Minor

9.5.4 *Risk of Increased Invasive Alien Plants*

Potential Impact: Construction

The Convention on Biological Diversity (CBD) defines an invasive alien species as one that is established outside of its natural past or present distribution, and whose introduction and/or spread threatens biological diversity ⁽¹⁾. The IUCN Red List of Threatened Species ⁽²⁾ rates the presence of invasive alien species globally as the second most significant threat to biodiversity, ⁽³⁾ and there is a growing global awareness of the problems associated with alien and invasive species. Alien species can be introduced either accidentally or intentionally. Although only a small percentage of alien species have the potential to become invasive, their impact is marked and usually is irreversible, displacing native species and leading to degradation of habitats.

Site clearance and soil disturbances create opportunities for invasive alien plants to establish. Extensive soil disturbance will occur during the construction phase and creates abundant potential for the establishment of invasive plants. Large infestations can develop, and if not controlled can serve as source populations for the spread into new areas.

Construction vehicles can accidentally gather invasive plant material and disperse seeds through normal movements. Construction equipment and vehicles, landscaping or rehabilitation could potentially introduce Alien and invasive species.

Summary of Baseline

The Baseline assessment revealed the presence of 10 alien species (Table 9.13), all are either weeds or are encouraged by communities for various reasons

(1) Convention for Biological Diversity, invasive species page. Available at:

<https://www.cbd.int/invasive/WhatareIAS.shtml>

(2) IUCN Red List of Threatened Species. Available at <http://www.iucnredlist.org/>

(3) IUCN Website, invasive species page. Available at: <https://www.iucn.org/theme/species/our-work/invasive-species>

and none of these species is known to cause dramatic loss of resources. Invasive species in the Project area are associated with modified habitats, which have a low ecological sensitivity.

Table 9.13 *Invasive and Alien Plants identified in the Project Area*

Species Name	English / Local Name	Comment
<i>Acacia polystachya</i>	Wattle	Plant is used as feed for livestock, Origin: Australia
<i>Aschranthes aspera</i>	Burr	Herbaceous species, present as a result of soil disturbances, and invasive in many countries around the world.
<i>Bidens pilosa</i>	Black jack	Introduced annual herb, present as a result of soil disturbances, causes losses to agriculture and livestock
<i>Gmelina arborea</i>	Gmelina	Tree species planted as source of firewood. Widely used in reforestation programs Due to its rapid growth rate.
<i>Pennisetum polystachion</i>	Udzu or Mission grass	Common grass, typically occurring in disturbed land, and vigorous annual or perennial grass growing to over 1 m height, producing large numbers of seeds with limited dormancy
<i>Melia azedarach</i>	Indian lilac tree	Common fast growing tree, growing disturbed land, and serves as a source of wood.
<i>Moringa oleifera</i>	Moringa	Fast growing exotic tree, typical of cultivated land, its leaves and seeds are edible.
<i>Rottboellia cochinchinensis</i>	Udzu (Itch grass)	Common grass, typically occurring in disturbed land, grows up to 4 m or more and is extremely competitive with annual crops
<i>Sida acuta</i>	Wireweed	Annual plant, present as a result of soil disturbances. Originating in central America, this small perennial shrub is tolerant of a wide range of growing condition and has successfully invaded the tropics worldwide, largely as a contaminant in pasture seed.
<i>Tridax procumbens</i>	Tridax daisy	Annual and present due to soil disturbances. Originated in Central America but now occurs throughout the tropics and subtropics. It was reportedly introduced into Nigeria as an ornamental in the early 1900s and later spread to many other tropical countries.

Assessment of Impacts: Construction

Table 9.14 below provides an assessment of impacts related to access restrictions during construction.

Table 9.14 Impact Assessment: Risk of Increased Invasive Alien Plants

Impact	Risk of Increased Invasive Alien Plants during Construction and Operations				
Impact Nature	Negative	Positive	Neutral		
	An increase in invasive alien plants is considered negative				
Impact Type	Direct	Indirect	Induced		
	Impact will be the result of a direct interaction between the Project, i.e. construction activities, clearance of vegetation and soil disturbances.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration is Long Term as invasive plants will gradually disappear				
Impact Extent	Local	Regional	International		
	Impact is limited to AoI :An area of approximately 180 Ha of habitat plus near vicinity will be affected				
Frequency	There will be ongoing risk of increased invasive alien plants				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	A limited diversity of invasive alien plants has been identified, but are already present due to the modified nature of the affected and surrounding habitats.				
Receptor Sensitivity	Low	Medium	High		
	The habitat is classified as modified, which qualifies for a low sensitivity and few of the species are highly invasive				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude of change is small and the sensitivity is high, the overall significance is considered to be of Moderate significance.				

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Invasive alien plants will be removed from areas controlled by ProjectCo. Manual removal will be favoured over mechanised or chemical control measures to the full extent possible.
- All alien vegetative and/or seed bearing material that is removed through control measures should be contained in a cordoned off area, dried and burnt on site to prevent the distribution of seeds.
- Vehicles and construction equipment should be washed on a regular basis and should be kept clean to minimise distribution of seeds and invasive plant material.
- Source areas such as vehicle parking and construction camps, if required, should be kept clean of invasive plants to minimise the presence of seeds that can be dispersed unintentionally.
- Disturbed areas will be rehabilitated at the earliest opportunity to minimise the establishment of invasive alien plants.

- Regular and ongoing monitoring of the presence of invasive alien plants should be conducted within construction and rehabilitated sites and removal operations implemented according to the results.

Residual Impact Significance

After the application of mitigation measures the Impact Significance during construction is considered to remain *Minor* (Table 9.15).

Table 9.15 *Pre and Post Mitigation: Risk of Increased Invasive Alien Plants*

Impact	Project Phase	Significance (Pre-mitigation)	Residual (Post-mitigation) Significance
Risk of Increased Invasive Alien Plants	Construction and operations	Minor	Negligible

9.5.5 *Disruption of Ecosystem Services*

Summary of Baseline

There is a wide diversity of ecosystem services present in the Project area, many of which are underpinned by biodiversity and all are important to community well-being in the area (Table 5.9). Three of these ecosystem services have been prioritised through an assessment of likelihood of impact by the Project, dependence of communities and lack of available alternatives (replaceability), namely supporting regulating, and provisioning.

Potential Impacts: Construction

Clearing of vegetation from the Project site for the construction of the Project is likely to result in loss or reduction of biodiversity ecosystem services that occur at the Project site. This may eventually result loss of livelihoods and habitats for fauna, and localised flooding.

Assessment of Impacts: Construction

Table 9.16 below provides an assessment of impacts related to access restrictions during construction.

Table 9.16 *Impact Assessment: Disruption of Ecosystem Services*

Impact	Disruption of Ecosystem Services during Construction				
Impact Nature	Negative	Positive	Neutral		
	Disruption of Ecosystem Services is considered negative				
Impact Type	Direct	Indirect	Induced		
	Impact will be the result of a direct interaction between the Project, i.e. construction activities and disturbance of ecosystem services				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact duration is Long Term as biodiversity recovers slowly				
Impact Extent	Local	Regional	International		
	Impact is limited to DAoI :An area of approximately 180 Ha				
Frequency	There will be ongoing risk of disruption of ecosystem services				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	A limited diversity of ecosystem services have been identified				
Receptor Sensitivity	Low	Medium	High		
	As there are priority ecosystems on the site the sensitivity is high.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude of change is small and the sensitivity is high, the overall significance is considered to be of Moderate significance.				

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation;
- Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such as wood fuel, mangoes, building materials or other useable resources.
- Piles of woody vegetation cleared for construction activities are to be made available to communities to access it for use as wood fuel or other purposes.

To note mitigation measures for loss of livelihoods as a result of land acquisition are also applicable to this impact (*Section 9.7*)

Residual Impact Significance

After the application of mitigation measures the Impact Significance during construction is considered to remain *Minor* (*Table 9.17*).

Table 9.17 *Pre and Post Mitigation: Disruption of Ecosystem Services*

Impact	Project Phase	Significance (Pre-mitigation)	Residual (Post-mitigation) Significance
Disruption of Ecosystem services	Construction	Moderate	Minor

9.6 *LANDSCAPE AND VISUAL*

9.6.1 *Introduction*

This assessment identifies potential impacts to the existing visual landscape as a result of the Project. Impacts will occur during construction and operations and primarily relates to the presence of construction equipment, materials, and workers during construction and solar reflection during operations (See *Figure 4.2*).

9.6.2 *Summary of Baseline*

The Project area is rural in nature and appearance as discussed in *Chapter 5 and 6*. In addition the communities of Mayambo and Kanzimbe are directly adjacent to the Project site.

It has been assumed that once constructed the solar PV panels will be no higher than three metres above the ground and the substation building will be no higher than five metres above the ground

9.6.3 *Potential Impact: Construction and Operation*

Temporary construction activities for the plant will have an impact on the visual character of the landscape due to the following:

- clearance of vegetation (in particular clearance of trees and removal of crops);
- presence of large construction vehicles and equipment on site;
- fencing of works and restrictions to site access; and
- construction of the plant.

Impacts during the operational phase include the colour change and a massing effect created by the PV panels covering a large area, limited early morning glare and some security lights at night. Generally, the reflection from PV systems is low intensity, similar to the impact from a body of water. Solar glare can have the potential to be hazardous to pilots (typically when panels are located at airports), motorists (when panels are located adjacent to roads), and onlookers.

There are no major transport networks near the Project site so will not be hazardous to aviation or motor vehicle traffic.

9.6.4 *Assessment of Impact: Construction*

Table 9.18) below provides an assessment of impacts related to access restrictions during construction.

Table 9.18 *Impact Assessment: Landscape and Visual Impact during Construction*

Impact	Landscape and visual amenity				
	Negative	Positive	Neutral		
Impact Nature	The change in visual character through on site presence during construction is considered negative.				
Impact Type	Direct	Indirect	Induced		
	The impact is a result of direct interaction between the Project and surrounding residents and land users.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact will be short term during the construction period (9 months)				
Impact Extent	Local	Regional	International		
	The impact extent will be local, affecting both indirect and direct AoI.				
Frequency	The frequency will be continuous during construction activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered to be small.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The receptor sensitivity is considered high given the rural nature of the Project AoI.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact significance is considered <i>moderate</i> .				

9.6.5 *Assessment of Impacts: Operations*

The potential impact is direct and negative, will be of a long term nature and the extent of the impact extends beyond the Project area and is regional in nature. The impact magnitude is considered medium as along with the above the panels will be located across the 168 Ha Project footprint.

Figure 9.4 shows that the solar panels will be visible from multiple Key Observation Points (KOP) surrounding the Project. The sensitivity of the KOPs and other receptors is medium. As a result the impact significance is considered to be moderate. It is important to note that over time the visual impact will decrease as receptors become accustomed to the Project.

Embedded Controls

The solar panels that have been selected for the Project are designed to absorb as much solar radiation as possible and therefore solar reflection is minimised.

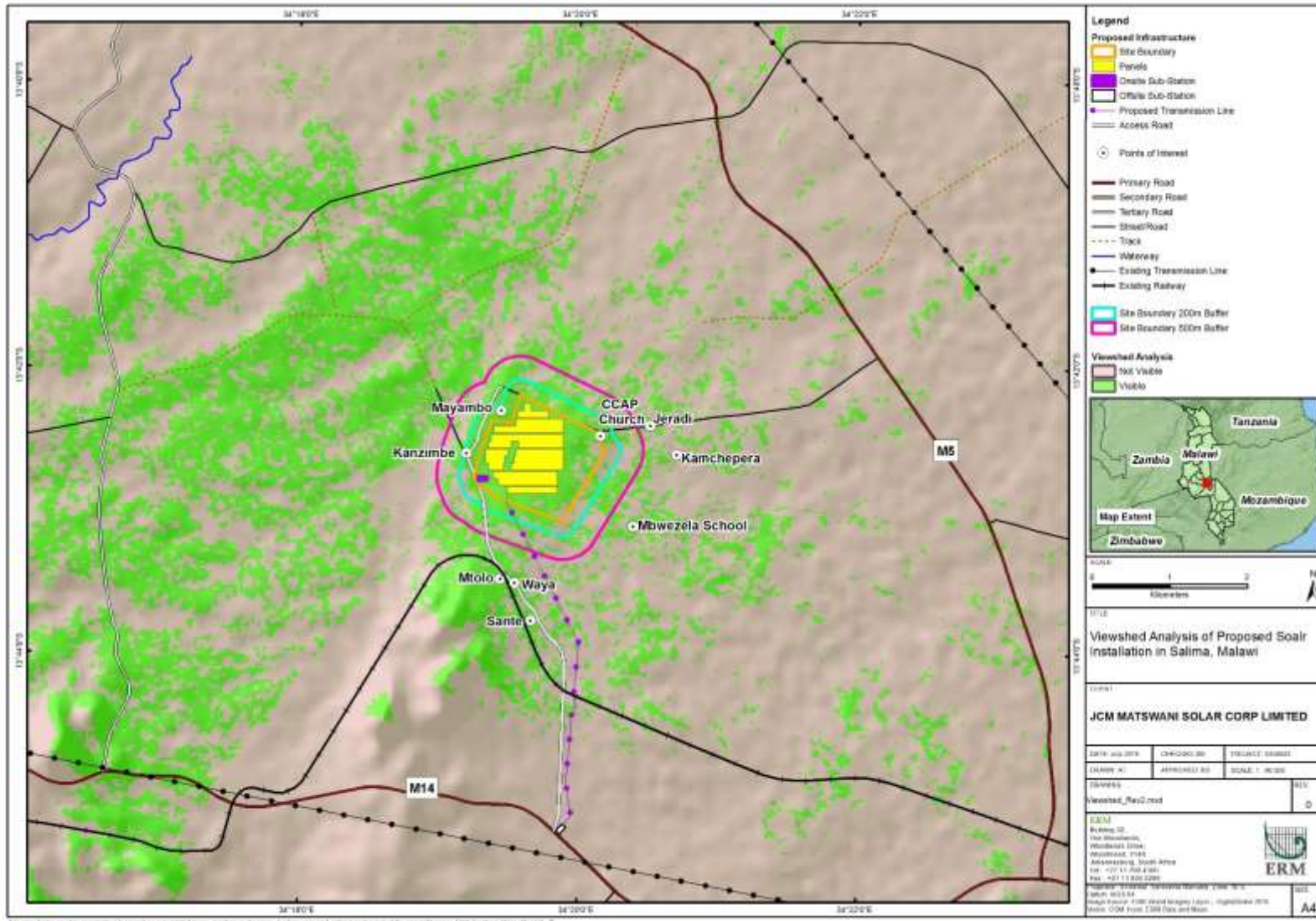


Figure 9.4 View shed of the Project in Relation to Surrounding Receptors

Table 9.19 Impact Assessment: Landscape and Visual Impact during Operation

Impact	Landscape and visual amenity				
Impact Nature	Negative	Positive	Neutral		
	The visual impacts from solar reflection on surrounding residents and land users is negative				
Impact Type	Direct	Indirect	Induced		
	The impact is a result of direct interaction between the project and surrounding residents and land users.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact will be short term during the construction period (expected to last no more than one year).				
Impact Extent	Local	Regional	International		
	The impact extent will be local, affecting the Project area (168 Ha Project footprint)				
Frequency	The frequency will be continuous during construction activities.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered to be small.				
Resource/ Receptor Sensitivity	Low	Medium	High		
	The receptor sensitivity is considered medium as the landscape is largely modified as result of agricultural activities, although there are communities nearby the Project site.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact significance is considered <i>Moderate</i>				

9.6.6 Mitigation Measures

Construction

The following mitigation measures will be implemented by the ProjectCo:

- Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the Project site boundary;
- Any excavated or cut and fill areas will be landscaped and allowed to revegetate;
- No debris or waste materials will be left at the work sites; and
- Appropriate directional and intensity settings will be utilised on all lighting.

Operations

The following mitigation measures will be implemented by the ProjectCo:

- Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation; and

- Maintain ongoing engagement between the Project and local communities with regards to potential solar reflection impacts.

9.6.7 *Residual Impact Significance*

The impact significance can be reduced to *minor* with the implementation of the best practice and relevant mitigation measures (Table 9.20) for both construction and operational activities.

Table 9.20 *Pre and Post Mitigation: Landscape and Visual Amenity*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Landscape and Visual Amenity	Construction	Moderate	Minor
Landscape and Visual Amenity	Operations	Moderate	Minor

9.7 *IMPACTS ON LAND ACQUISITION AND DISPLACEMENT*

9.7.1 *Introduction*

This assessment identifies potential impacts from land acquisition for the Project. Impacts will occur during construction phase and result in a loss of livelihoods for affected people (See Figure 4.2).

9.7.2 *Summary of Baseline*

All the villages in the Project area rely on subsistence farming for their household food consumption, with some households generating a small income from crops. Additionally, livestock rearing, particularly of goats and poultry is common. Livestock use the Project area for grazing.

Farmers generally have land plots that are under one ha. In combination with small land plots and a lack of irrigation, communities suffer food shortages during the dry seasons, especially December to February, referred to as the 'hunger season'. Additionally, malnutrition of children is reportedly common in the villages, which impacts on the wellbeing of children and their ability to attend school.

Affected land users reside in Kanzimbe and Sadzu Group Villages, covering Mayambo, Jeputala, Malezi, Waya, Njoka, Kachepera, Menyako, Chishasa, Santhe, Chikwakwa, Thangani and Sadzu. To date, approximately 250 land users are affected: 72 people were compensated by Phase I of land acquisition: 50 people in Kanzimbe Village (24 males and 26 females) and 22 people in

Mayambo Village (8 males and 14 females). In terms of Phase II, a total of 166 people are impacted (77 males and 89 females).

Within the direct Project footprint affected by land acquisition there is only one structure within the planned transmission line wayleave. Field surveys confirmed that the structure is not residential and is only being used by a goat farmer and his watchman. Asset surveys undertaken for the LRP suggest that displacement of this structure can be avoided through a minor diversion of the transmission line.



Figure 9.5 Impacted Structure in the Transmission Line Wayleave

9.7.3 *Potential Impacts: Construction*

Land acquisition will trigger economic displacement of land users, primarily comprising subsistence farmers. Due to food shortages in communities resulting from inefficient farming techniques, the impact of land acquisition and economic displacement is likely to exacerbate food insecurity and malnutrition, and heighten poverty levels.

The high levels of subsistence farming within the communities in the Project area produces low income levels and high levels of poverty. As such, economic displacement could lead to further impoverishment if not well managed.

9.7.4 *Assessment of Displacement Impacts*

Table 9.21 below provides an assessment of impacts related to land acquisition and displacement (prior to mitigation).

Table 9.21 Temporary and Permanent Economic Displacement

Impact	Economic displacement of land users, including subsistence farmers and land for livestock grazing.				
Impact Nature	Negative	Positive	Neutral		
	Considered a negative impact as it has the potential to create food insecurity, increased malnutrition and impoverishment.				
Impact Type	Direct	Indirect	Induced		
	Direct impact resulting from land acquisition and land clearance to accommodate land required during construction, including laydown areas, worker camps etc Project infrastructure.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts will be experienced during construction.				
Impact Extent	Local	Regional	International		
	The impact will be experienced by land users within the direct Project Footprint that reside in Kanzimbe and Sadzu Group Villages. It will also affect the structure that will be used for a small livestock farming business.				
Frequency	The impact will be one-off, pre-construction.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be medium as the impact is expected to have a major negative impact on affected land users.				
Resource/ Receptor Vulnerability	Low	Medium	High		
	Land users are highly vulnerable due to their economic status and lack of education that would allow them to adapt to change.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact is expected to be <i>major</i> .				

9.7.5 Mitigation Measures

As it is anticipated that ProjectCo will divert the transmission line in order to avoid the structure. Therefore, in order to manage impacts associated with land economic displacement, a Livelihood Restoration Plan (LRP) will be developed by ProjectCo that will include the following;

- identification of affected land users;
- census and asset inventory to assess compensation measures for those affected;
- assessment of eligibility and entitlements for those affected;
- Identification of gender differentiated and sustainable livelihood improvement and / or restoration measures (these may include but are not limited to financial literacy training, training on improved farming practices etc);
- provisional implementation budgets;
- roles and responsibilities, including details of an institutional structure / Livelihood Restoration Steering Committee;

- monitoring and evaluation requirements; and
- provisional implementation schedule.

It should be noted that at the time of writing this ESIA, the LRP was under development and is expected to be finalised by mid-October 2018. A participatory consultation approach is in the process of being undertaken to support the development of the LRP, ensuring that those affected will be involved in decision making processes required for implementation.

9.7.6 *Residual Impact Significance*

Provided the above mitigation measures are implemented, the residual impact related to land acquisition and displacement to *minor* significance levels (Table 9.22).

Table 9.22 *Pre and Post Mitigation: Physical and Economic Displacement*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Economic displacement of land users, including land for grazing, and displacement of one structure	Construction	Major	Minor

9.8 *IMPACTS ON ACCESS ROUTES, INCLUDING ACCESS TO FARMLAND*

9.8.1 *Introduction*

This assessment identifies potential impacts from land acquisition for the Project. Impacts will occur during construction and operation phase and result in a loss access routes to crop areas surrounding the Project site (See Figure 4.2).

9.8.2 *Summary of Baseline*

Villages in the Project area have close ties and bonds created mostly by farming activities. The villages also gather during community events such as weddings and funerals. There are a number of pathways that transect the planned solar site that may be impacted during construction and operation, potentially restricting access to villages and farmland.

9.8.3 *Potential Impacts: Construction and Operation*

During construction, safety fencing, security and equipment may block access to the pathway extending the distance that people in communities have to travel to neighbouring villages. Additionally, restrictions may also affect

access to farmland. Additionally, during operation, the solar site will be fenced, blocking access to pathways through the site.

9.8.4 Assessment of Impact: Construction and Operation

Table 9.23 below provides an assessment of impacts related to access restrictions during construction and operation. Figure

Table 9.23 Impact Assessment: Access Restrictions

Impact	Occurrence of restricted access villages and farmland during construction and operation				
Impact Nature	Negative		Positive		Neutral
	Considered a negative impact due to disruptions to community network and access to farmland during construction and operation.				
Impact Type	Direct		Indirect		Induced
	Direct impact resulting the presence of construction equipment during construction and the solar site during operation.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts will be experienced during construction and operation as users will have to use access routes around construction areas and the solar site.				
Impact Extent	Local		Regional		International
	Access will restrict local communities that use land in the pathway through the planned solar site.				
Frequency	Restrictions will be experienced permanently.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be <i>medium</i> as the communities have close ties and frequently use the pathways transecting the site.				
Resource/ Receptor Vulnerability	Low		Medium		High
	Due to the reliance on land for subsistence farming and pathways for community support networks, access restrictions could heighten the vulnerability of communities.				
Impact Significance	Negligible		Minor	Moderate	Major
	The impact could affect farming activities and community support networks, therefore the impact is considered moderate.				

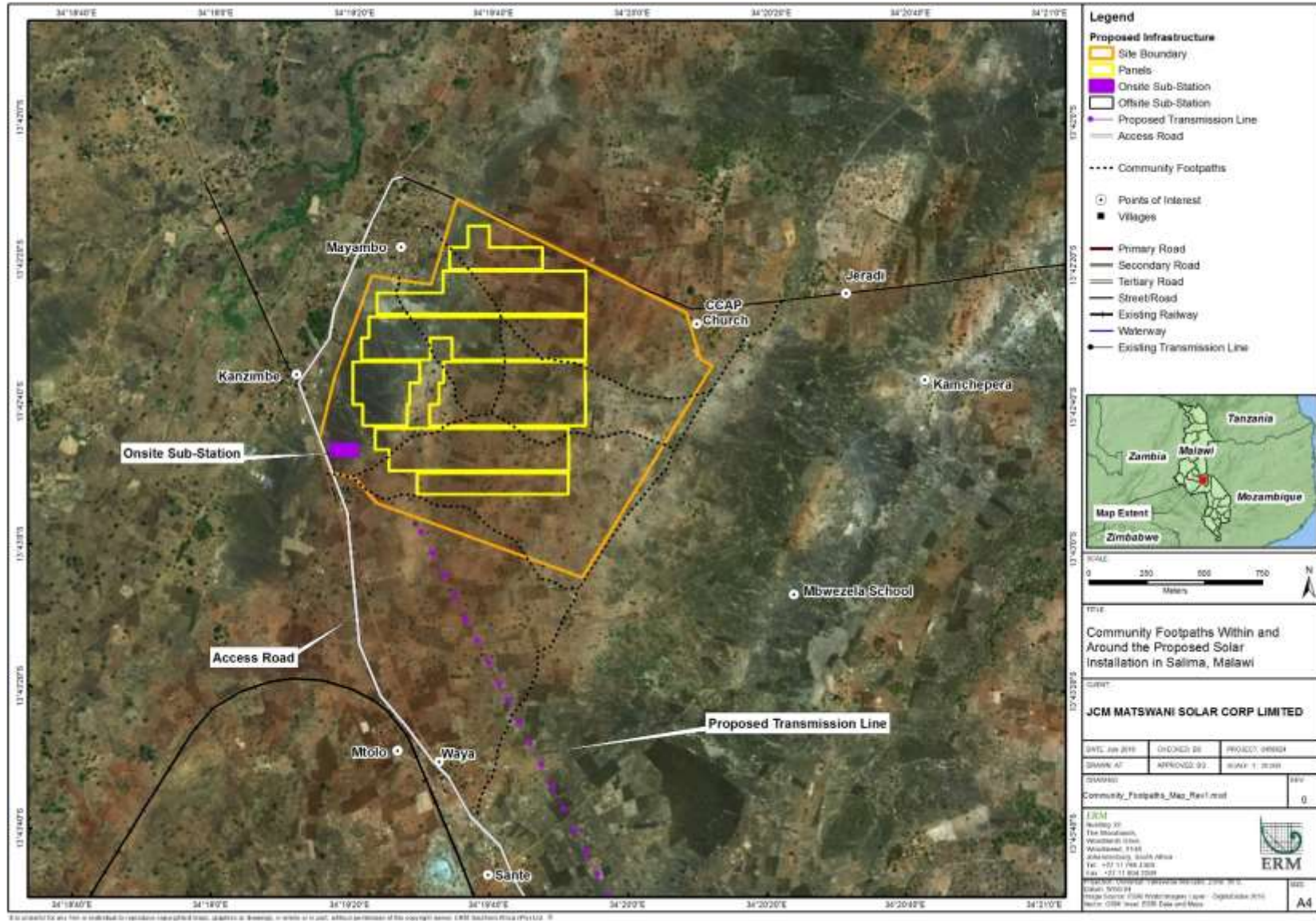


Figure 9.6 Access Routes in the Project Area

9.8.7 *Mitigation Measures*

The following mitigation measures will also be implemented by the ProjectCo

- Undertake consultation with communities using farmland in areas affected during construction to establish the best alternative routes and measures that the Project should put in place to minimize impacts related to access restrictions without compromising the design of the facility.

9.8.8 *Residual Impact Significance*

With the mitigation measures included above, the impact significance is expected to be *Minor* during construction and operations (Table 9.24).

Table 9.24 *Pre and Post Mitigation: Access Restrictions*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Access restrictions resulting from the presence of construction activities and equipment.	Construction	Moderate	Minor
Access restrictions resulting from the presence of the solar farm.	Operation	Moderate	Minor

9.9 *IMPACTS ON VECTOR BORNE OR COMMUNICABLE DISEASES*

9.9.1 *Introduction*

This assessment identifies potential impacts on communities in the Project area as result of vector borne and/or communicable diseases. Impacts will primarily occur in the construction phase and result in increased health risks for communities in the Project area (See Figure 4.2).

9.9.2 *Summary of Relevant Baseline Conditions*

Malaria is the most prevent illness experienced by men, women and children in the Project area due to poor sanitary conditions in villages. It is particularly prevalent during the rainy season as pools of rain water accumulate in low lying areas. Reportedly, it is common for latrines to collapse during the rainy season that exacerbates such conditions, resulting in open defecation and poor hygiene practices. Gastric illnesses such as diarrhoea, colds and other illnesses can spread if proper sanitation and hygiene is not effectively managed.

Additionally, poor cooking methods such as cooking in confined spaces and use of firewood and charcoal impact on women’s health, creating respiratory infections.

9.9.3

Potential Impacts: Construction

Communicable diseases are caused by viral, bacterial, parasitic and fungal pathogens that are airborne or that are transmitted through an infected person, animal or environmental source. Communicable diseases include malaria, tuberculosis, measles and bacterial infections such as colds, gastric infections (eg diarrhoea) and alike.

It is anticipated that during the construction period the workforce will comprise up to 200 people, skilled and unskilled, some of which may be from the local area and others from elsewhere. Although it is not planned to place a temporary construction camp at the site, a mobile office with waste and sanitation facilities is required. The biggest risk associated with this impact is workers from outside the local area being more susceptible to communicable diseases or bringing communicable diseases into the area that are currently not prevalent. Additionally, in combination with community-worker interaction, inadequate hygiene and waste management controls at the construction site could also enable the increased transmission of communicable diseases.

Additionally, in the event of an outbreak of an airborne (eg TB) or food-borne illness among the workers, the home communities of the local workers, and any of those visited by the Project workforce may also become susceptible to these infectious diseases.

Moreover, due to the existing high prevalence of malaria, increased transmission due to Project activities is considered to be unlikely but could result if new breeding grounds for mosquitoes are created. This includes creation of wheel ruts from traffic or pools of water in and around land clearance or laydown areas.

Furthermore, construction activities have the potential to exacerbate existing high rates of respiratory infections due to dust emissions. Women in the communities often suffer from respiratory infections due to traditional cooking practices, such as use of firewood and charcoal in confined spaces. This situation may be exacerbated during construction due to higher levels of dust emissions and also vehicle emissions. Additionally ground preparations and land clearance may create dust particles. This is most likely to impact the western portion of the site situated adjacent to Kanzimbe and Mayambo Villages (as described in *Section 9.1 Air Quality*) excavation activities and construction traffic. Although dust suppression measures will be implemented, additional dust may be associated with any real (or perceived) increase in such diseases.

During operation only 20 workers will be required with minimal traffic. As such no impacts are expected during this period.

9.9.4

Assessment of Impact: Construction

Table 9.25 below provides an assessment of potential impacts related to an increase in vector borne and communicable diseases during construction.

Table 9.25 Increase in Vector Borne and Communicable Diseases

Impact	Increase in vector borne and communicable diseases				
Impact Nature	Negative		Positive		Neutral
	Construction activities may exacerbate existing high rates of malaria, respiratory illness and gastric illnesses.				
Impact Type	Direct		Indirect		Induced
	Direct impact resulting the presence of construction equipment and activities in combination with the workforce, in particular community-worker interaction.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts are likely only to be experience during peak construction periods, when the number of workers and activities is at the highest.				
Impact Extent	Local		Regional		International
	Impacts are only likely to affect a small portion of neighbouring villages, where the majority of construction activities are occurring.				
Frequency	Occasional - The risk for increased vector or communicable diseases will be constant throughout the construction. However, it is likely to occur occasionally.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be <i>small</i> as the workforce will not be residing on site and construction activities will occur in phases,				
Resource/ Receptor Vulnerability	Low		Medium		High
	The communities are vulnerable to an increase in vector borne and communicable diseases as presence levels are already high.				
Impact Significance	Negligible		Minor	Moderate	Major
	The impact has the potential to affect a small proportion health of neighbouring villages such as Kanzimbe, Mayambo and others situated adjacent to the site.				

9.9.5

Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Provide workforce training on communicable diseases, disease prevention and treatment to raise awareness.
- Establish a worker Code of Conduct that includes guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities (refer to mitigation provided in *Section 9.11*).
- Provide workers with appropriate gender considerate sanitary facilities which are appropriately designed to prevent contamination.

- Develop a robust waste handling system to avoid the creation of new vector breeding grounds.
- Establish measures through environmental controls which reduce the presence of standing water onsite during the site preparation phase to avoid the creation of new breeding grounds.
- Ensure that working areas, such as site office areas are kept clean and free from any accumulation of wastes as well as supplied with clean potable water. This includes ensuring appropriate food preparation and monitoring measures are in place.
- Have a first aid point on site to avoid adding pressure on local health facilities. However, arrangements will be made with nearby hospitals so sick Project workers who cannot be fully treated at the Project first aid point be referred for treatment.
- In line with best practice requirements regarding the health of the workforce, develop and implement pre-employment screening measures to ensure that workers are fit for work, as well as identify any pre-existing conditions. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilisation to site. However, no one should be denied employment on the basis of their health status as long as they are able to undertake the required duties (following treatment if relevant).

9.9.6 *Residual Impact Significance*

With the mitigation measures included above, the impact significance is expected to be *negligible* (Table 9.26).

Table 9.26 *Pre and Post Mitigation: Vector Borne or Communicable Diseases*

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Increase in vector borne or communicable diseases resulting from the presence of the workforce and resulting from construction activities.	Construction	Minor	Negligible

9.10 *IMPACTS ON SEXUALLY TRANSMITTED INFECTION (STIs)/HIV TRANSMISSION RATES*

9.10.1 *Introduction*

This assessment identifies potential impacts on communities in the Project area as result of STI's and HIV transmission. Impacts will primarily occur in the construction phase and result in increased health risks for communities in the Project area (See *Figure 4.2*).

9.10.2 *Summary of Baseline Conditions*

Health workers and men reported STI's as one of the most common health issues in the Project area. Additionally, at the time of the Salima Social-Economic Profile 2006, HIV/AIDS was emerging as a serious 'pandemic' and programmes were being carried out in the District to raise awareness and promote behavioural change to prevent an increase.

In combination with this, men admitted that they have unprotected sex and that they do not like to ask health workers for condoms. Women also highlighted that unwanted pregnancies are also common resulting from lack of contraceptive use.

Additionally, one of the main challenges reported by health workers and women during the social surveys is gender based violence (GBV), rape and early marriage. This impacts on girls' education as they are forced to leave school due to early pregnancy. In Kanzimbe, reportedly girls and women are enticed by men with money and other valuables such as mobile phones in exchange for sex, leading to unplanned pregnancies and STIs. This suggests that young women are vulnerable to impacts relating to STI/HIV transmission.

Gender based issues was one of the key concerns raised during the engagement process for the ESIA.

9.10.3 *Potential Impact: Construction*

The presence of the workforce and expectations regarding job opportunities creating influx has the potential to create an increase in STI/HIV prevalence due to worker-community interactions with young women seeking to better their lives through income generation, or relationships with the workforce (expatriates or Malawians). Additionally, high prevalence of sexual abuse and gender based violence in the Project area could be exacerbated resulting from increased jealousy and accusations of women interacting with outsiders or from tension from perceptions that the community has not benefitted from the Project. (eg in relation to employment for example)

9.10.4 Assessment of Impacts: Construction

Table 9.27 below provides an assessment of potential impacts related to an increase in STIs/HIV transmission during construction.

Table 9.27 Assessment of Impacts: Increase in STI/HIV Transmission

Impact	Increase in STI/ HIV Transmission				
	Negative	Positive	Neutral		
Impact Nature	The presence of the workforce and the potential for influx has the potential to influence an increase in STI / HIV transmission.				
Impact Type	Direct	Indirect	Induced		
	The impact is likely to be induced by an increase of people in the Project area in combination with young women perceiving this increase as an economic opportunity. Additionally, high vulnerability of women in the Project area may trigger sexual abuse or GBV leading to unprotected sex.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	Impacts are likely only to be experience during the during construction phase				
Impact Extent	Local	Regional	International		
	Impacts are only likely to affect the local community.				
Frequency	Occasional - The risk for increased STI/HIV transmission will be occasional to rare.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be <i>small</i> as the Project is not expected to create a significant increase to the population and the workforce will not be accommodated on site where there is increased potential for worker-community interactions.				
Resource/ Receptor Vulnerability	Low	Medium	High		
	Young women and women generally are highly vulnerable due to high rates of sexual abuse and GBV, in combination with high poverty levels that have the potential to create an economic opportunity.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact has the potential to affect a small proportion of the population.				

9.10.5 Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Develop and implement an STI management plan that should include, among other things, the following measures:
 - STI and HIV prevention training to all employees, through workshops, posters and informal information sessions;
 - Medical examinations to determine level of health. Workers should also be encouraged to determine their HIV status;
 - Supply of condoms at the construction site;

- Development of a Code of Conduct / rules for worker-community interaction and on-site behaviour;
- Provide support to workers and the community to access treatment for STIs and in particular HIV/ AIDS through existing health facilities or NGO campaigns or programmes;
- During the construction phase support a women’s NGO that is addressing gender and GBV issues in Salima and in Project affected communities, to raise awareness of such issues and to encourage prevention. This should also include monitoring of GBV and sexual abuse issues.

9.10.6 Residual Impact Significance

With the mitigation measures included above, the impact significance is expected to be *negligible* (Table 9.28).

Table 9.28 Pre and Post Mitigation: Increase in STI/HIV Transmission

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Increase of STI / HIV transmission resulting from worker-community interaction and sexual interactions between communities through economic opportunities or sexual abuse / GBV	Construction	Minor	Negligible

9.11 IMPACTS ON COMMUNITY SAFETY AND SECURITY

9.11.1 Introduction

This assessment identifies potential impacts of the Project on Community, Health, and Safety. Impacts will primarily occur in the construction phase and result in increased safety risks for communities in the Project area (See Figure 4.2).

9.11.2 Summary of Relevant Baseline Conditions

Security incidents in the Project Area are infrequent and mainly comprise of burglaries and livestock theft. Arson in a nearby village was a recent occurrence that was reported, however the reasons for this are unknown. In addition, gender based violence incidents, sexual abuse, and early marriages are common in the villages and were reported during the social baseline studies.

9.11.3

Potential Impacts: Construction and Operation

Generally, security incidents in the Project area are infrequent and mainly comprise petty crime and livestock theft.

Additionally, Project safety hazards may arise from the presence of construction equipment and activities, construction infrastructure (e.g. mobile offices) including from construction traffic. Moreover, the presence of such equipment and facilities may trigger risk/temptation of theft due to high levels of poverty in communities in the Project area.

Incidents may also arise as a result of worker-community interactions with security guards or other staff, influx and perceptions that other people are benefitting from the Project more than others causing tension among communities.

During operation, security risks are potentially associated with the presence of the Project and the transmission line which could pose a threat to trespassers encroaching into the solar farm to steal panels or that try to connect to the transmission line.

9.11.4

Assessment of Impact: Construction

Table 9.29 below provides an assessment of potential impacts related to risks associated with community safety and security during construction.

Table 9.29 Community Safety and Security – Construction

Impact	Community Safety and Security			
	Negative	Positive	Neutral	
Impact Nature	Safety risks associated with construction activities and the presence of the workforce in combination with tensions between communities with others are perceived to be benefitting from the Project more than others.			
Impact Type	Direct	Indirect	Induced	
	The impact will be direct, impacting the communities within the Project area			
Impact Duration	Temporary	Short Term	Long Term	Permanent
	The risk of safety and security impacts will be during construction due to the presence of construction traffic, equipment, the workforce etc.			
Impact Extent	Local	Regional	International	
	The impact will be experienced by local communities			
Frequency	Occasional - the number of incidents that occur are likely to be occasional.			
Impact Magnitude	Positive	Negligible	Small	Medium
	Based on the parameters above, the magnitude is considered to be small.			
Resource/ Receptor Vulnerability	Low	Medium	High	
	The most vulnerable in communities that are likely to be subject to such impacts are women, children the youth and elderly.			
Impact Significance	Negligible	Minor	Moderate	Major
	The impact is expected to be moderate			

Mitigation Measures

The following mitigation measures will also be implemented:

- ProjectCo will train security personnel in safeguarding of the community in high tension situations such as community protests and community conflicts resulting in human rights abuses. This will include training the existing community policing function to provide support and engage the GVH's and TA when required.
- ProjectCo security will comply with Malawian laws and regulations as well as the requirements of the Voluntary Principles for Security and Human Rights. The security will include, among other things, selection of personnel based on a careful background screening, and monitoring of performance.
- ProjectCo will put in place security measures to minimise safety risks and the possibility of theft in construction camps, storage areas etc.
- ProjectCo will establish clear and visible signage in construction areas to warn the community of any risks and hazards.
- ProjectCo will establish a community engagement programme to provide information about safety hazards and raise awareness of how these are being managed. This includes visits to all neighbouring communities and local schools.
- ProjectCo will raise awareness to communities regarding their Grievance Mechanism to deal with community concerns and issues in a timely manner to avoid issues escalating. This will include the use of the Community Liaison Officer who will be present around the Project Site pre and during construction.

9.11.5 *Assessment of Impacts: Operations*

Table 9.30 below provides an assessment of potential impacts related to risks associated with community safety and security during operation.

Table 9.30 Community Safety and Security: Operation

Impact	Community Safety and Security				
Impact Nature	Negative	Positive	Neutral		
	Security and safety risk are associated with the presence of the solar farm and the transmission lines, which pose a risk to opportunities trespassing onto the site or attempting to illegally connect to the transmission line.				
Impact Type	Direct	Indirect	Induced		
	The impact will be induced as a result of high levels of poverty and lack of access to electricity in neighbouring communities.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The risk will remain throughout the life of the Project.				
Impact Extent	Local	Regional	International		
	Incidents are likely to occur locally.				
Frequency	Occasional - the number of incidents that occur are likely to be occasional-rare				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the parameters above, the magnitude is considered to be small.				
Resource/ Receptor Vulnerability	Low	Medium	High		
	The most vulnerable in communities that are likely to be subject to such impacts are the youth and farmers.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact is expected to be minor				

9.11.6 Mitigation Measures

The following mitigation measures will be implemented by the ProjectCo:

- Fence the solar farm and have security personnel present at all times to avoid trespassers entering the site to access solar panels.
- Security will comply with Malawian laws and regulations as well as the requirements of the Voluntary Principles for Security and Human Rights. The security will include, among other things, selection of personnel based on a careful background screening, and monitoring of performance.
- Establish clear and visible signage in hazardous areas to warn the community of any risks and hazards.

9.11.7 Residual Impact Significance

With the mitigation measures included above, the impact significance during construction and operations is expected to be *negligible* (Table 9.31).

Table 9.31 Pre and Post Mitigation: Community Safety and Security

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Safety and security risks may arise from the presence of the solar farm and the transmission line.	Construction	Moderate	Minor
Community safety and security incidents arising from the presence of the workforce (including security personnel) and construction activities.	Operation	Minor	Negligible

9.12 IMPACT ON LABOUR AND WORKING CONDITIONS

9.12.1 Introduction

This assessment identifies potential impacts on workers from the working conditions they will experience. Impacts will occur in the construction and the operation phase and result in increased health and safety risks for workers. Please note that occupational health and safety issues are also covered in this section.

9.12.2 Summary of Relevant Baseline Conditions

According to the Malawi Human Rights Country Report (2016) ⁽¹⁾, the main human rights issues prevalent in the country include corruption, child labour, gender discrimination (including GBV), HIV/AIDS stigmatism, child abuse and early marriage. The report also highlights some of the challenges in relation to labour and working conditions, including:

- rights in relation to establishing unions and collective bargaining, in the informal sector;
- forced labour;
- child labour; 2014 *Malawi Millennium Development Goal End line Survey* found that almost 40 percent of children ages five to 17 were engaged in some form of child labour ⁽²⁾ .
- discrimination in employment and occupation occurred with respect to gender and disability; and

(1) US Department of State. Malawi Human Rights Report 2016. Available at <https://www.state.gov/documents/organization/265486.pdf> (accessed March 2018)
 (2) Cited in US Department of State. Malawi Human Rights Report 2016. Available at <https://www.state.gov/documents/organization/265486.pdf> (accessed March 2018)

- acceptable conditions of work, including minimum wages, working hours, occupational health and safety and management of worker grievances.

Regardless of these instances, Malawi has ratified all eight of the core International Labour Organisation Conventions, listed in *Box 9.1* below ⁽¹⁾.

Box 9.1 ***Ratified ILO Conventions***

- | |
|--|
| <ul style="list-style-type: none"> • C029 - Forced Labour Convention, 1930 (No. 29), 19 Nov 1999 • C087 - Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87), 19 Nov 1999 • C098 - Right to Organise and Collective Bargaining Convention, 1949 (No. 98), 22 Mar 1965 • C100 - Equal Remuneration Convention, 1951 (No. 100), 22 Mar 1965 • C105 - Abolition of Forced Labour Convention, 1957 (No. 105), 19 Nov 1999 • C111 - Discrimination (Employment and Occupation) Convention, 1958 (No. 111), 22 Mar 1965 • C138 - Minimum Age Convention, 1973 (No. 138), Minimum age specified: 14 years, 19 Nov 1999 • C182 - Worst Forms of Child Labour Convention, 1999 (No. 182), 19 Nov 1999 |
|--|

Enforcement of labour laws and the ILO conventions is the biggest challenge in relation to labour and working conditions.

9.12.3 ***Potential Impact: Construction and Operation***

Issues regarding labour and working conditions in Malawi include long working hours, inappropriate salaries, gender discrimination and child labour. As such, if not properly managed, these issues could affect the workforce, mainly during construction, and the local communities within the Project area who are highly vulnerable due to low levels of education and high levels of poverty.

Additionally, workers have the ability to protest if they perceive working conditions to be unsatisfactory, which could create delays to the Project, reputational risk and poor worker relationships.

Additionally, poor occupational health and safety can cause injury and fatalities if not managed as well affect relationships with the workforce. During construction these activities will involve the operation of heavy equipment and trucks, working at height, working in confined spaces, construction traffic, use of electrical devices, handling of hazardous materials and other hazardous activities. Due to the nature of the activities being undertaken during construction phase, worker H&S is a key risk with the potential for accidents that may result in injuries and fatalities as well as lost man-hours.

(1) International Labour Organisation. Available at https://www.ilo.org/dyn/normlex/en/f?p=NORMLEXPUB:11200:0::NO::P11200_COUNTRY_ID:103101 (accessed July 2018)

Hazardous activities during the operation phase and regular maintenance activities will include, but not be limited to; the operation of heavy equipment and trucks, working on electrical devices including high voltage, working at height, maintenance of high pressure pipework and vessels and handling of hazardous materials. During these activities the workers will be at risk for accidents and injury.

9.12.4 *Assessment of Impact: Construction and Operation*

Table 9.32 below provides an assessment of potential impacts related to risks associated with labour and working conditions during construction and operation.

Table 9.32 *Impact Assessment: Labour and Working Conditions*

Impact	Labour and Working Conditions				
	Negative	Positive	Neutral		
Impact Nature	Discrimination and non-compliant labour and working conditions has the ability to create delays to the Project, cause reputational risk and create poor worker. Additionally, poor occupational health and safety can cause injury or fatalities.				
Impact Type	Direct	Indirect	Induced		
	The impact will have a direct effect on the workforce.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The risk will remain throughout the life of the Project.				
Impact Extent	Local	Regional	International		
	Incidents are likely to occur locally.				
Frequency	Constant - the risks associated with poor labour and working conditions could be constant.				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	The workforce will comprise up to 200 people during construction and 20 during operation. Therefore the magnitude of the impacts is considered small.				
Resource/ Receptor Vulnerability	Low	Medium	High		
	The most vulnerable in communities that are likely to be subject to such impacts are the youth, women and children.				
Impact Significance	Negligible	Minor	Moderate	Major	
	The impact is expected to be moderate.				

9.12.5 *Mitigation Measures*

The following mitigation measures will be implemented by the ProjectCo:

- Develop a Human Resources Policy, which includes a Labour and Employment Plan and Worker Grievance Mechanism. These will also be developed and reflected in sub-contractor contracts. Key issues within Human Resource (HR) management and contracts will include, but not be limited to the following:

- Provision of clear and understandable information regarding rights under national labour and employment law, and any applicable collective agreements, including those related to hours of work, wages, overtime, compensation, etc.
- Provision of reasonable working conditions and terms of employment.
- Provision of adequate accommodation (where relevant).
- Provision of employment, compensation/remuneration and working conditions, including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects.
- Non-discrimination in all aspects of labour recruitment, management and exit.
- Provision of adequate welfare facilities on site.
- Implementation of a Grievance Mechanism for Project workers (including sub-contractors).
- Adoption and implementation of a sexual harassment policy.
- Freedom of association.
- Ensure that contracts will make explicit reference to the need to abide by Malawian law and international standards (in particular IFC PS 2) and the ILO conventions ratified by Malawi relating to health and safety, labour and welfare standards.
- Ensure that as part of any contractor and supplier selection process, performance with regard to worker management, worker rights, health and safety as outlined in Malawian law and international standards will be managed and reported on.
- Support contractors in adhering to labour and working conditions that are in line with Malawian legislation and IFC PS 2 through awareness raising and information provision, as necessary.
- Undertake regular checks of contractors to ensure the relevant labour laws are adhered to at all times.
- A health and safety programme will be developed that includes risk assessments (such as working at heights, confined space machine guarding), work permit systems and a H&S management system, in line with industry best practice, including worker performance safety tracking

(safety observations) to assure worker safety. All workers will receive induction and continuous training regarding this system.

- Establish a hiring mechanism to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.
- Ensure that all workers (including those of contractors and subcontractors) will, as part of their induction, receive training on worker rights in line with Malawian legislation and international standards.
- Ensure that all workers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights. Contracts must be in place prior to workers leaving their home location, if applicable.
- Ensure that a fair and transparent worker Grievance Mechanism is in place that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed. The grievance mechanism shall be open to the EPC Contractor and subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer.
- Ensure that all workers (including those of the contractor and subcontractor) will have access to training on communicable diseases, STI's and community interactions in general. This training should be developed in collaboration with local health institutions and local NGO's where practical.

9.12.6 Residual Impact Significance

With the mitigation measures included above, the impact significance is expected to be *Minor* (Table 9.33).

Table 9.33 Pre and Post Mitigation: Labour and Working Conditions

Impact	Project Phase	Significance (Pre-mitigation)	Residual Impact Significance (Post-mitigation)
Poor labour and working conditions has the ability to delay the Project, create reputational risk and cause injury and fatalities.	Construction and operation	Moderate	Minor

9.13 *UNPLANNED EVENTS*

9.13.1 *Introduction*

The following *Section* presents the assessment of impacts resulting from unplanned or non-routine events and those which are a result of accidents. These are different to impacts that would reasonably be predicted to occur in the normal course of activities (including the application of in-built control measures) during construction and operation.

The evaluation of impacts for unplanned and accidental event takes into account the likelihood of the event occurring into the impact magnitude. Likelihood is determined as unlikely, possible, or likely based in professional judgement and quantitative information (statistical frequency) where available.

Given the nature of Project activities, unplanned and accidental events are limited to potential accidental spills of fuel and oils, improper storage or disposal of waste, and vehicle traffic accidents. If these were to occur, there could be effects on the biophysical and social environment. The following potential risks of likely unplanned or accidental events are described in this *Section*:

- Impacts on soil and groundwater from spill events and improper disposal of waste; and
- Traffic accidents

9.13.2 *Soil and Groundwater from Spill Events/Improper Disposal of Waste (Land Contamination)*

Potential Impacts

Spills and improper disposal of waste have the potential to affect terrestrial environments and could lead to the deterioration of soil, water and sediment quality. This could lead to knock on effects for flora and fauna and local community users.

During construction there is the potential for spills of fuels and oils during construction activities, fuelling, maintenance of machinery and vehicles as well as improper waste storage and disposal. Spills/improper disposal of waste could occur within the Project footprint resulting in soil and groundwater degradation.

During operation of the Project, there is the potential for improper waste storage and disposal (for example of broken panels).

Summary of Relevant Baseline Conditions

See Section 9.4.2

Assessment of Impacts

Incidental spills of fuels are likely to be infrequent, but have the potential to occur; most frequently due to malfunction of handling systems, poor practice of workers and *force majeure*. Spills are most likely to occur during refilling and transportation of substances. There is no large-scale storage of fuels or chemicals on the Project site. Large releases of hazardous materials would therefore be rare and it is considered unlikely that a spill would occur of emergency scale. Improper disposal of waste can occur throughout the construction phase if appropriate disposal measures are not put in place.

Table 9.34 and Table 9.35 below provides an assessment of impacts related to access restrictions during construction and operation.

Table 9.34 Impact Assessment for Unplanned Events for Spills/Improper Disposal of Waste to Soil

Impact	Accidental Spillages on Soil/ improper disposal of waste				
	Negative	Positive	Neutral		
Impact Nature	Reduction in local soil quality as a result of spillage during maintenance of machinery, improper storage of hazardous materials, spillage during transfers of fuel, improper disposal of waste and general construction activities.				
Impact Type	Direct	Indirect	Induced		
	Impact is a result as a direct interaction between project activities soil resources in the AoI and Project Footprint				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is long term due to remediation time expected for contaminated soils				
Impact Extent	Local	Regional	International		
	The impact will be limited to AoI				
Frequency	Not Applicable				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the above the impact magnitude is considered medium				
Resource/ Receptor Sensitivity	Low		Medium	High	
	The land use surrounding the project footprint is largely agricultural and therefore the sensitivity is medium.				
Impact Significance	Negligible		Minor	Moderate	Major
	Considering the impact magnitude is medium and the sensitivity is medium the overall significance is considered to be <i>moderate</i> .				

Table 9.35 Impact Assessment for Unplanned Events for Spills/Improper Disposal of Waste to Groundwater

Impact	Accidental Fuel Spills on groundwater				
Impact Nature	Negative	Positive	Neutral		
	Reduction in local soil quality as a result of spillage during maintenance of machinery, improper storage of hazardous materials, spillage during transfers of fuel, improper disposal of waste and general construction activities				
Impact Type	Direct	Indirect	Induced		
	Impact is a result as a direct interaction between project activities surface water resources along the wayleave and construction areas				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is long term due to remediation time expected for remediation				
Impact Extent	Local	Regional	International		
	The impact will be limited to groundwater in the AoI				
Frequency	Not Applicable				
Likelihood	Unlikely				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the impact magnitude is considered medium				
Resource/ Receptor Sensitivity	Low	Medium	High		
	Groundwater use is prevalent in the surrounding communities, therefore the sensitivity is considered high.				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is medium and the sensitivity is high the overall significance is considered to be <i>major</i>				

Preventative Measures

The following management measures will be implemented by the ProjectCo:

- The Project will develop a Hazardous Spill Response Plan (HSRP) and maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated.
- The Project will develop and implement a Waste Management Plan.
- Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, or removed by a local contractor. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hardstanding surface.
- Hazardous material storage will be on hard standing and impermeable surface and the storage facility will be bunded. The Project will restrict storage and handling of hazardous materials and fuels to bunded areas of sufficient capacity to contain a release.

Residual Impact Assessment Conclusions

With the implementation of preventive measures and development of a Hazardous Spill Response Plan, the residual impact is reduced to acceptable levels.

9.13.3 *Traffic Accidents*

Potential Impacts

Increased traffic and presence of heavy vehicles on local roads as a result of Project development increases the risk of road traffic accidents involving members of the community. For the construction of the Project a considerable number of trucks will be needed to transport construction equipment (materials, sand, soil, waste) and solar PV components to and from the construction site. Operational traffic movements will be very low.

Summary of Relevant Baseline Conditions

See Section 2.6.

Assessment of Impacts

The increased traffic volumes as result of the Project will increase the risk of potential vehicle accidents. The likelihood is *possible* due to the increase in traffic volume and the current poor state of roads in the area. However, the EPC will upgrade the site access road to cater for construction traffic.

Considering also the settlements along the roads and the current uses of the road, proximity of community activities and buildings to the roads, the sensitivity of receptors is considered to be high, and the consequence of a potential accident is *severe* due to the potential for injuries or fatalities.

Table 9.36 below provides an assessment of impacts related to access restrictions during construction and operation.

Table 9.36 Impact Assessment for Unplanned Events for Vehicle Accidents

Impact	Vehicle Accidents				
Impact Nature	Negative	Positive	Neutral		
	Increased traffic and presence of heavy vehicles on local roads as a result of Project development increases the risk of road traffic accidents involving members of the community during construction and operation.				
Impact Type	Direct	Indirect	Induced		
	Impact is a result as a direct interaction between project activities and community members and other road users.				
Impact Duration	Temporary	Short Term	Long Term	Permanent	
	The impact is long term due to remediation time expected for remediation				
Impact Extent	Local	Regional	International		
	The impact can occur along construction and delivery routes				
Frequency	Not Applicable				
Likelihood	Possible				
Impact Magnitude	Positive	Negligible	Small	Medium	Large
	Based on the impact magnitude is considered medium				
Resource/ Receptor Sensitivity	Low	Medium	High		
	Sensitivity is high due to the communities along the road network				
Impact Significance	Negligible	Minor	Moderate	Major	
	Considering the impact magnitude is medium and the sensitivity is medium the overall significance is considered to be <i>major</i> .				

Preventative Measures

The following Mitigation measures will be implemented:

- Traffic Management Plan, driving codes of conduct and enhanced driver safety awareness will be implemented.
- Site access road will be upgraded to ensure it is suitable for construction traffic volumes.
- Plan traffic routes to limit road use by the Project during high traffic periods (including pedestrian traffic) and in sensitive areas such as near schools in order to reduce interaction with public road use.
- Assess local road conditions and discuss road maintenance during Project construction to minimise traffic risks associated with roads deteriorated from Project activities.
- The Project will provide driver training to promote safe and responsible driving behaviour. The training will also target contractors and subcontractors.
- Engage with local communities and authorities to inform them about plans and procedures
- Implement awareness campaigns recording traffic and road safety in communities along the transport corridor.

- Work with the relevant local and regional government to ensure the roads used by Project vehicles are well maintained, and that potential problems or hazards are communicated to the relevant authority timeously.

Residual Impact Assessment Conclusions

With the implementation of preventive measures and development of a Traffic Management Plan, the residual impact is reduced to acceptable levels.

9.14

CUMULATIVE IMPACTS

ERM have confirmed with the ProjectCo that there are no further planned industrial developments within proximity of the Project site or the greater area. Thus, at present, there are no cumulative impacts to consider.

10.1 OVERVIEW

This *Chapter* presents the Environmental and Social Management Plan Framework (ESMP) for the construction and operation of the Project. The ESMP specifies the mitigation and management measures to which the ProjectCo is committed and shows how they will mobilise organisational capacity and resources to implement these measures. The objective is to make sure that there are appropriate mitigation measures in place and that the responsible individuals consistently follow them.

The ESMP draws together the proposed mitigation measures; groups them logically into components with common themes; defines the specific actions required and timetable for implementation; identifies training needs, institutional roles and responsibilities for implementation as well as including a monitoring programme.

10.2 PROJECT ESMP OBJECTIVE

The key objectives of the ESMP are to:

- formalise and disclose the programme for environmental and social management; and
- provide a framework for the implementation of environmental and social management initiatives.

Best practice principles require that every reasonable effort is made to reduce, and prevent negative impacts while enhancing the benefits.

A key feature of the ESMP is the idea of continual improvement – an ongoing process of reviewing, correcting and improving the system. The most common approach for this is implemented through the Plan – Do – Check – Act cycle, as shown in *Figure 10.1*.

It is recognised that the ESMP is a live document that will be regularly updated to accommodate changing circumstances as the Project evolves.

Identifying and analysing the risks and objectives
What is important for you as an organisation and what are you going to do about it?

Developing and implementing a potential solution
What actions will you take? Who, what, where, when and how?

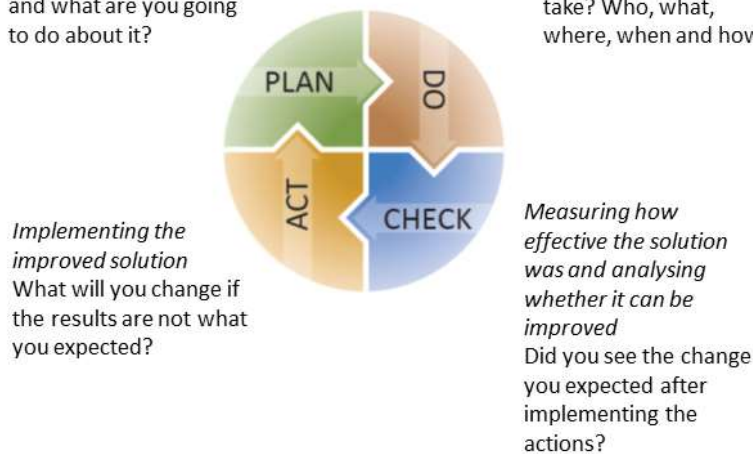


Figure 10.1 *Plan - Do - Check - Act Cycle (After IFC 2014)¹*

10.3 *SCOPE OF THE ESMP*

The ESMP applies to all activities associated with site clearance and construction activities, as well as the operational phase of the Project, including all work sites established during construction and operations.

The ESMP includes all activities conducted by, or on behalf of the ProjectCo on the Project site, including contractors. The scope of the ESMP will be reviewed annually as part of the Management Review.

10.4 *ENVIRONMENTAL AND SOCIAL MANAGEMENT PROCEDURES*

The management programmes are centred on mitigation measures to avoid minimise or compensate for the risks and impacts that have been identified.

Management procedures are ordered by project phase; construction followed by operational phase. *Table 10.1* (construction) and *Table 10.2* (operation) detail the Management procedures. Decommissioning is discussed in *Section 10.5.6*.

¹ IFC, 2014, Environmental and Social Management System Implementation Handbook, Construction

10.5 PLANNING

10.5.1 *Classification of Impacts*

The Project has utilised the impact assessment through the ESIA process as a tool to identify key impacts and associated mitigation and management measures. This impact assessment was conducted for the construction, operation and decommissioning phases of the Project.

10.5.2 *Positive Impacts*

During Construction

As noted in *Chapter 8*, positive impacts are associated with economy and livelihoods through the creation of 200 workers (expected to be unskilled, semi-skilled and skilled during construction).

During Operation

During operation, up to 20 workers are expected to be required during operational activities. In addition, the generation of electricity is expected to have a significant positive impact to Malawi.

10.5.3 *Adverse Impacts*

During Construction

During construction, the following adverse impacts are predicted; these will be mitigated through the implementation of the ESMP:

- air quality (including dust);
- noise;
- landscape and visual amenity;
- groundwater;
- soil erosion;
- biodiversity;
- land acquisition and, physical and economic displacement;
- restrictions/ disruption to access routes;
- temporary influx / community cohesion;
- transmission of vector borne or communicable diseases;
- transmission of sexually transmitted infections (STIs)/HIV;
- community safety and security;
- labour and working conditions;
- employment and the economy; and
- unplanned events including improper disposal of waste.

During Operation

The following impacts have been identified as a risk during operation which will be mitigated through the implementation of the ESMP:

- landscape and visual amenity;
- groundwater;
- land acquisition and, physical and economic displacement;
- restrictions/ disruption to access routes;
- temporary influx / community cohesion;
- transmission of vector borne or communicable diseases;
- transmission of sexually transmitted infections (STIs)/HIV;
- community safety and security;
- labour and working conditions;
- employment and the economy; and
- unplanned events including improper disposal of waste.

All of the above identified impacts are addressed through management measures included in *Table 10.1* and *Table 10.2*.

10.5.4 *Management Plans*

Additional detailed policies and plans will be developed to support the implementation of this ESMP. The timing of the development of these plans may be staged, ensuring that the appropriate focus and level of detail is provided for construction and operational activities.

A full list of the management plans for this Project that will be finalised by the ProjectCo is provided below:

- Waste Management Plan;
- Human Resources Management Plan;
- Gender Development Plan;
- STI/HIV Management Plan;
- Emergency Response Plan;
- Hazardous Spill Response Plan;
- Livelihood Restoration Plan;
- Community Investment Plan;
- Stakeholder Engagement Plan; and
- Traffic Management Plan.

10.5.5 *Contractor Environmental and Social Management Plan(s)*

The Project will engage contractors to carry out project activities during both the construction and operational phases. The Project requires that all contractors will be responsible for performing all work:

- in compliance with applicable law and regulations, and with other requirements to which the Project subscribes;
- in conformance with the Project ESMP, and related management plans for specific aspects; and
- in accordance with contractual technical and quality specifications.

The Project's ESMP and related documentation will be the main contractual documentation to which the contractor and environmental and social documentation and procedures will be bridged. Contractors will be required to develop their own management plans which show how they will comply with these environmental and social requirements. In this way, the ESMP will be implemented and controlled using both the Project and the contractor management systems.

Table 10.1 Construction Environmental and Social Management Procedures

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
Positive Impacts						
8.1	Employment and the Economy • Employment opportunities and the need for the supply of goods and services has the potential to create jobs for the local community and improve income levels.	Provide opportunities to local communities to enhance income levels, skills/employability and improve the quality of life.	<ol style="list-style-type: none"> ProjectCo will establish a recruitment strategy for staff required pre and during construction to enable the community to access job opportunities where possible. Although recruits will require a basic level of skills prior to recruitment, ProjectCo will provide training opportunities and internships to males and females in local communities in order to enhance their skills, increasing employability and career development opportunities at a later stage. EPC Contractor will source goods and services required for construction and operation in Salima District as much as possible. Following this, goods and services in Lilongwe and at a national level will be sought prior to sourcing outside of Malawi In addition to the LRP, which will target directly affected communities, ProjectCo will develop and implement a broader gender differentiated Community Investment Program (CIP) that will include measures to enhance livelihood, skills capacity and employability in neighbouring communities and surrounding areas. This will be established through a gender focused and participatory needs assessment. 	• Pre and during construction	<ul style="list-style-type: none"> Review of numbers to be embedded in the EPC contractor scope of work USD 10,000 for review of recruitment performance 	<p>1,2,4).ProjectCo Project Manager</p> <p>3) EPC Contractor</p> <p>Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator</p>
Adverse Impacts						
9.1	Air Pollution: • Site preparation, construction activities, equipment, material and worker transportation will generate fugitive dust emissions which could act as a nuisance for nearby sensitive receptors.	Minimise deterioration of ambient air quality from construction activities	<ol style="list-style-type: none"> restrict the removal of vegetation and soil cover to those necessary for the Project; land clearance should be sequential and where ground and earthworks are undertaken the smallest possible area for working will be exposed; stripping of topsoil will not be conducted earlier than required (maintain vegetation cover for as long as possible) in order to prevent the erosion (wind and water) of organic matter, clay and silt. a speed limit of 30 kph on unpaved surfaces to be enforced and the national speed limits on public roads are not to be exceeded; all transported materials must be covered with tarpaulins to prevent fugitive dust; where feasible, surface binding agents will be used on exposed open earthworks; exposed ground and earthworks where wind generated dust occurs, should be covered as much as possible, for example with sheeting, shade cloth or tarpaulin; stockpiles stored longer than six weeks should be vegetated or covered (with sheeting, shade cloth or tarpaulin) to reduce soil loss from wind or storm water runoff; stockpiles will be located as far away from receptors as possible and will be covered (with sheeting, shade cloth or tarpaulin); wind breaks will be erected around the key construction activities and, if possible, in the vicinity of potentially dusty works, to minimise impacts at the nearby temporary residential accommodation and permanent residential receptors; all construction vehicles must be regularly maintained to minimise exhaust emissions; when not in use, vehicles will be switched off, unless impractical for health and safety reasons (for example, maintenance of air conditioning); and any complaints received from neighbours must be reported to the EHS Coordinator or the EPC Contractor through the Grievance Mechanism. 	Regularly throughout construction	Ongoing maintenance costs included within the EPC Contractor's bid	<p>1-12) EPC Contractor</p> <p>13) ProjectCo CLO and EHS Coordinator</p> <p>Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator</p>

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
9.2	Noise Pollution • Site preparation, construction activities, equipment, material and worker transportation will generate fugitive dust emissions which could act as a nuisance for nearby sensitive receptors.	To avoid disturbance to surrounding land-users by maintaining noise levels within required limits (55 dBA during the day time (07:00- 22:00) and 45 dBA during the night time (22.00 – 07.00))	<ol style="list-style-type: none"> maintain machines and plant equipment in good working condition and inspect regularly; selection of equipment and vehicles in accordance with best available techniques for noise reduction; minimise vehicle movements within and around the site as much as possible; use local screening/site hoardings to screen noise where appropriate; and any complaints received from neighbours must be reported to the EHS Coordinator or the EPC Contractor through the Grievance Mechanism. 	Regularly throughout construction phase	1-4) Ongoing costs included in the EPC contractor's bid CLO to be hired as part of ProjectCo's operational budget	1-5) EPC Contractor 5) ProjectCo EHS Coordinator and CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.3	Soil Erosion • Loss of arable soils and reduced soil quality.	To avoid soil erosion and the consequent loss of soil quality and quantity.	<ol style="list-style-type: none"> Mitigation measures for air emissions are applicable to this impact (<i>Section 9.1.5</i>). erosion control measures such as intercept drains and toe berms will be constructed where necessary. Access roads will be well drained in order to limit soil erosion. 	Regularly throughout construction phase	Ongoing costs included in the EPC contractor's bid	1) As per section above 2,3) EPC Contractor Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.4	Groundwater Resources • Water supply for the Project during the construction phase is anticipated to be derived from the groundwater. This may have an effect on other waters users.	To prevent the contamination of surface and groundwater and to not negatively affect other water users in terms of water availability.	<p><i>Embedded Controls</i></p> <ol style="list-style-type: none"> Monitoring of water levels within existing wells and boreholes will be undertaken during installation drilling and pump testing of project abstraction boreholes. Radius of influence will be recalculated using site-specific hydrogeological parameters. Project abstractions will be located outside the radius of influence if practical. <p><i>Mitigation Measures</i></p> <ol style="list-style-type: none"> a further assessment will be done at a later stage with updated information from all community boreholes; continuous monitoring of affected village supplies and a cessation of project abstraction if the groundwater elevation in village water supply wells reaches a pre-agreed level. water storage solutions (eg tanks) for water pumped during the wet season for use during the dry season. 	Regularly throughout construction phase	USD 15,000 for monitoring and assessment programme Embedded controls part of design costs for Project	1-5) ProjectCo Project Manager Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.5.1	Biodiversity • Loss of Habitats and Fauna Disturbance	Minimise impacts on terrestrial flora, fauna and avifauna during construction.	<ol style="list-style-type: none"> Ensure that vegetation is methodically cleared from the Project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation. Planning should be conducted in advance to determine the minimum feasible extent required. Predetermined areas should be clearly demarcated on the ground, fenced where appropriate and enforcement measures taken to avoid footprint creep into surrounding areas. Provisions that prohibit staff and contractors from engaging in all forms of hunting in the Project area must be included in the Worker Code of Conduct. Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation. 	Prior to and regularly throughout construction phase	1,2,4) EPC Contractor actions as part of EPC construction costs 3) Code of Conduct: 1000 USD	1,2,4) EPC Contractor 3) ProjectCo Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.5.2	Biodiversity • Loss of Threatened Flora	Minimise impacts on terrestrial flora during construction.	<ol style="list-style-type: none"> Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation; 	Prior to and regularly throughout construction phase	1,2,3) EPC Contractor actions as part of EPC construction costs	1,2,3) EPC Contractor 4) ProjectCo

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
			<ol style="list-style-type: none"> Ensure that vegetation is methodically cleared from the Project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation. Planning should be conducted in advance to determine the minimum feasible extent required. Predetermined areas should be clearly demarcated on the ground, fenced where appropriate and enforcement measures taken to avoid footprint creep into surrounding areas. Provisions that prohibit workers and contractors from clearing/utilising word and plant species in the Project Area 		4) Code of Conduct: 1000 USD	Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.5.3	Biodiversity <ul style="list-style-type: none"> Risk of Increased Invasive Alien Plants 		<ol style="list-style-type: none"> Invasive alien plants will be removed from areas controlled by EPC Contractor. Manual removal will be favoured over mechanised or chemical control measures to the full extent possible. All alien vegetative and/or seed bearing material that is removed through control measures should be contained in a cordoned off area, dried and burnt on site to prevent the distribution of seeds. Vehicles and construction equipment should be washed on a regular basis and should be kept clean to minimise distribution of seeds and invasive plant material. Source areas such as vehicle parking, construction camps should be kept clean of invasive plants to minimise the presence of seeds that can be dispersed unintentionally. Disturbed areas will be rehabilitated at the earliest opportunity to minimise the establishment of invasive alien plants. Regular and ongoing monitoring of the presence of invasive alien plants should be conducted within construction and rehabilitated sites and removal operations implemented according to the results. 	Regularly throughout the construction phase	Ongoing costs included in the EPC contractor's bid	EPC Contractor Quarterly Reports of EPC to be undertaken by ProjectCo EHS Coordinator
9.5.4	Biodiversity <ul style="list-style-type: none"> Disruption of Ecosystem Services 		<ol style="list-style-type: none"> Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation; Maintain ongoing engagement between the Project and local communities, with communities informed in advance of any vegetation clearing to allow pre-harvesting of resources such as wood fuel, mangoes, building materials or other useable resources. Piles of woody vegetation cleared for construction activities are to be made available to communities to access it for use as wood fuel or other purposes. 	Regularly throughout the construction phase	1,3) Ongoing costs included in the EPC contractor's bid 2) Part of CLO responsibilities	1,3) EPC Contractor 2) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.6	Landscape and Visual Amenity <ul style="list-style-type: none"> Impact on the visual character of the landscape 	Minimise the visual impact on surrounding sensitive receptors	<p><i>Mitigation Measures</i></p> <ol style="list-style-type: none"> Ongoing rehabilitation of cleared areas to minimise visual scarring and maintenance clearing will be kept to the absolute minimum and should not extend beyond the Project site boundary; Any excavated or cut and fill areas will be landscaped and allowed to revegetate; No debris or waste materials will be left at the work sites; and Appropriate directional and intensity settings will be utilised on all lighting. 	Regularly throughout the construction phase	Ongoing costs included in the EPC contractor's bid	EPC Contractor Quarterly Reports of EPC activities to be undertaken by ProjectCo EHS Coordinator
9.7	Land acquisition and displacement <ul style="list-style-type: none"> Land clearance, causing economic displacement, in particular of subsistence farmers and land 	Avoid and minimise displacement as well as a mitigate negative impacts and enhance positive impacts	<ol style="list-style-type: none"> Develop a Livelihood Restoration Plan (LRP) that includes the following: <ol style="list-style-type: none"> Identification of affected land users; Census and asset inventory to assess compensation measures for those affected; Assessment of eligibility and entitlements for those affected; Identification of gender differentiated and sustainable livelihood improvement and / or restoration measures (these may include but are not limited to financial literacy training, training on improved farming practices etc); Provisional implementation budgets; 	August 2018	LRP development USD 60,000 LRP implementation to be determined	ProjectCo is responsible for the development and implementation of the LRP. Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
	for livestock grazing. • Displacement of one structure used for a goat farmer in the wayleave. The structure is not used for residential purposes.		f. Roles and responsibilities, including details of an institutional structure / Livelihood Restoration Steering Committee; g. Monitoring and evaluation requirements; and h. Provisional implementation schedule. 2. Ensure an inclusive and participatory consultation process that ensures the participation of women, men, youth, elderly, disabled and other groups in the decision making process in relation to replacement land and livelihood restoration programmes.			
9.8	Access restrictions • The presence of construction equipment and activities during this period may block pathways that transect the solar site, including access to communities and farmland	Minimise restrictions to existing pathways transecting the Project site	1. Undertake consultation with communities using farmland in areas affected during construction to establish the best alternative routes and measures that the Project should put in place to minimize impacts related to access restrictions.	Prior to and regularly throughout the construction phase	As part of CLO Responsibilities	ProjectCo CLO Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.9	Vector borne and communicable diseases • Construction equipment and activities have the potential to create dust emissions and create breeding grounds for vector borne illnesses affecting communities living in villages adjacent to the solar site. • Additionally the presence of the workforce during this period in combination with poor sanitary conditions has the potential to increase communicable diseases	Avoid the risk of increasing prevalence of vector borne and communicable diseases	1. Provide workforce training on communicable diseases, disease prevention and treatment to raise awareness. 2. Establish a worker Code of Conduct that includes guidelines on worker-worker interactions, worker-community interactions and development of personal relationships with members of the local communities 3. Provide workers with appropriate gender friendly sanitary facilities which are appropriately designed to prevent contamination. 4. Develop a robust waste handling system to avoid the creation of new vector breeding grounds. 5. Establish measures to reduce the presence of standing water onsite during site preparation through environmental controls to avoid the creation of new breeding grounds. 6. Ensure that working areas, such as site office areas are kept clean and free from any accumulation of wastes as well as supplied with clean potable water. This includes ensuring appropriate food preparation and monitoring measures are in place. 7. Have a first aid point on site to avoid adding pressure on local health facilities. However, agreements will be made with nearby hospitals so sick Project workers who cannot be fully treated at the Project first aid point be referred for treatment. 8. In line with best practice requirements regarding the health of the workforce, develop and implement pre-employment screening measures to ensure that workers are fit for work, as well as identify any pre-existing conditions. Individuals found to be suffering from communicable diseases will need to seek treatment prior to mobilisation to site. However, no one should be denied employment on the basis of their health status as long as they are able to undertake the required duties (following treatment if relevant).	Prior to and regularly throughout the construction phase	1,3,4,5,6,7,8) Part of EPC contractor bid 2) Project : USD 2000	1,3,4,5,6,7,8) EPC contractor 2) ProjectCo Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.10	STI/HIV transmission	Avoid an increase in STI/HIV transmission and worker-community	1. Develop and implement an STI management plan that should include, among other things, the following measures:	Prior to and regularly through construction	STI Management Plan: USD 6,000 Support for NGO USD 10,000	1-2) ProjectCo Quarterly Reports of ProjectCo activities to be

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
		interaction and increase in GBV / inappropriate sexual interaction in communities	<ul style="list-style-type: none"> STI and HIV prevention training to all employees, through workshops, posters and informal information sessions; Medical examinations to determine level of health. Workers should also be encouraged to determine their HIV status; Supply of condoms at the construction site; Development of a Code of Conduct / rules for worker-community interaction and on-site behaviour; Provide support to workers and affected communities to access treatment for STIs and in particular HIV/AIDS through existing health facilities or NGO campaigns or programmes; <p>2. During the construction phase support a women's NGO that is addressing gender and GBV issues in Salima and in Project affected communities, to raise awareness of such issues and to encourage prevention. This should also include monitoring of GBV and sexual abuse issues.</p>		Implementation has part of ProjectCo's costs	undertaken by ProjectCo EHS Coordinator
9.11	Community safety and security <ul style="list-style-type: none"> Security risk in relation to petty crime, increased GBV and perceptions that people in the communities are benefitting more than others creating tensions. Worker-community interactions, including the presence of security may pose a threat to the community. 	Avoid risks associated with safety and security	<ol style="list-style-type: none"> Project will train security personnel in safeguarding of the community in high tension situations such as community protests and community conflicts resulting in human rights abuses. This will include training the existing community policing function to provide support and engage the GVH's and TA when required. Project security will comply with Malawian laws and regulations as well as the requirements of the Voluntary Principles for Security and Human Rights. The security will include, among other things, selection of personnel based on a careful background screening, and monitoring of performance. Project will provide security measures for the construction site to minimise safety risks and the possibility of theft. Project will establish clear and visible signage in construction areas to warn the community of any risks and hazards. Project will establish a community engagement programme to provide information about safety hazards and raise awareness of how these are being managed. This includes visits to all neighbouring communities and local schools. Project will raise awareness to communities regarding their Grievance Mechanism to deal with community concerns and issues in a timely manner to avoid issues escalating. This will include the use of the Community Liaison Officers who will be present around the Project Site pre and during construction. 	Prior to and regularly through construction	1,3,4) as part of EPC contractor bid. 2,5,6) Part of CLO responsibilities	1,3,4) EPC contractor 2,5,6) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator
9.12	Labour and working conditions <ul style="list-style-type: none"> During peak construction the workforce may be subject to poor labour and working conditions. 	Avoid risks associated with labour and working conditions	<ol style="list-style-type: none"> Develop a Human Resources Policy, which includes a Labour and Employment Plan and Worker Grievance Mechanism. These will also be developed and reflected in sub-contractor contracts. Key issues within Human Resource (HR) management and contracts will include, but not be limited to the following: <ul style="list-style-type: none"> Provision of clear and understandable information regarding rights under national labour and employment law, and any applicable collective agreements, including those related to hours of work, wages, overtime, compensation, etc. Provision of reasonable working conditions and terms of employment. Provision of adequate accommodation (where relevant). Provision of employment, compensation/remuneration and working conditions, 	Plans and Policies to be developed prior to construction	HR Policy: USD 2000 Gender Development Plan: USD 7000 Engagement activities part of CLO responsibilities	1,2,5) ProjectCo 3,4,6,7,8,9,10,12) EPC Contractor 11) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
			<p>including working hours, based on equal opportunity and fair treatment, avoiding discrimination on any aspects.</p> <ul style="list-style-type: none"> • Non-discrimination in all aspects of labour recruitment, management and exit. • Provision of adequate welfare facilities on site. • Implementation of a Grievance Mechanism for Project workers (including sub-contractors). • Adoption and implementation of a sexual harassment policy. • Freedom of association. 			
			<p>2. Prepare a Gender Development Plan to promote gender equality in relation to job opportunities as well as support the mitigation of gender based violence, and other gender related issues within the workforce and externally (eg in project affected communities)</p>			
			<p>3. Ensure that contracts will make explicit reference to the need to abide by Malawian law and international standards (in particular IFC PS 2) and the ILO conventions ratified by Malawi relating to health and safety, labour and welfare standards.</p>			
			<p>4. Ensure that as part of any contractor and supplier selection process, performance with regard to worker management, worker rights, health and safety as outlined in Malawian law and international standards will be managed and reported on.</p>			
			<p>5. Support contractors in adhering to labour and working conditions that are in line with Malawian legislation and IFC PS 2 through awareness raising and information provision, as necessary.</p>			
			<p>6. Undertake regular checks of contractors to ensure the relevant labour laws are adhered to at all times.</p>			
			<p>7. Implement a health and safety programme will be developed that includes risk assessments (such as working at heights, confined space machine guarding), work permit systems and a H&S management system, in line with industry best practice, including worker performance safety tracking (safety observations) to assure worker safety. All workers will receive induction and continuous training regarding this system.</p>			
			<p>8. Establish a hiring mechanism to ensure no employee or job applicant is discriminated against on the basis of his or her gender, marital status, nationality, ethnicity, age, religion or sexual orientation.</p>			
			<p>9. Ensure that all workers (including those of contractors and subcontractors) will, as part of their induction, receive training on worker rights in line with Malawian legislation and international standards.</p>			
			<p>10. Ensure that all workers (including those of contractors and subcontractors) will have contracts which clearly state the terms and conditions of their employment and their legal rights. Contracts will be verbally explained to all workers where this is necessary to ensure that workers understand their rights. Contracts must be in place prior to workers leaving their home location, if applicable.</p>			
			<p>11. Ensure that a fair and transparent worker Grievance Mechanism is in place that will be accessible to all workers, whether permanent or temporary, directly or indirectly employed. The grievance mechanism shall be open to the EPC Contractor and subcontractor workforce in the event that their grievance is not adequately resolved by their direct employer.</p>			
			<p>12. Ensure that all workers (including those of the contractor and subcontractor) will have access to training on communicable diseases, STI's and community interactions in general. This training should be developed in collaboration with local health institutions and local NGO's where practical.</p>			

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/ Avoidance/Enhancement Measures	Schedule for Implementation	Estimated Budget (US \$)	Institutional Responsibility
9.13	Unplanned Events: <ul style="list-style-type: none"> Spill events leading to land contamination, soil and groundwater contamination 	Minimise the impact of unplanned spillage events	<ol style="list-style-type: none"> The Project will develop a Hazardous Spill Response Plan (HSRP) and maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated. The Project will develop and implement a Waste Management Plan. Refuelling of equipment and vehicles will be carried out in designated areas on hard standing ground to prevent seepage of any spillages to ground. Collection systems will be installed in these areas to manage any spills, fuels will be collected and either reused, or removed by a local contractor. Drip trays must be used when refuelling and servicing vehicles or equipment, where it is not on a hardstanding surface. Hazardous material storage will be on hard standing and impermeable surface and the storage facility will be bunded. The Project will restrict storage and handling of hazardous materials and fuels to bunded areas of sufficient capacity to contain a release. 	<p>Plans must be in place prior to construction.</p> <p>Other measures regularly throughout construction phase</p>	Costs for Plans, emergency spill kits and clean-up activities included in EPC contractor's bid.	<p>1-4) EPC Contractor</p> <p>Quarterly Reports of EPC activities to be undertaken by ProjectCo EHS Coordinator</p>
9.13	Unplanned Events: <ul style="list-style-type: none"> Traffic Accidents 	Reduce risk for traffic accidents impacting community health and safety	<ol style="list-style-type: none"> A Traffic Management Plan, driving codes of conduct and enhanced driver safety awareness will be implemented Plan traffic routes to limit road use by the Project during high traffic periods (including pedestrian traffic) and in sensitive areas such as near schools in order to reduce interaction with public road use. Assess local road conditions and discuss road maintenance during Project construction to minimise traffic risks associated with roads deteriorated from Project activities. The Project will provide driver training to promote safe and responsible driving behaviour. The training will also target contractors and subcontractors. Engage with local communities and authorities to inform them about plans and procedures Implement awareness campaigns recording traffic and road safety in communities along the transport corridor. Work with the relevant local and regional government to ensure the roads used by Project vehicles are well maintained, and that potential problems or hazards are communicated to the relevant authority timeously. 	<p>Plan must be in place prior to construction.</p> <p>Other measures regularly throughout construction phase</p>	<p>Traffic Management Plan USD 7000</p> <p>Engagement as part of CLO responsibilities</p> <p>Driver training as part of EPC contractor bid.</p>	<p>1,2,3,5,6,7) ProjectCo</p> <p>4) EPC Contractor</p> <p>Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator</p>

Table 10.2 Operational Environmental and Social Management Procedures

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/Enhancement Measures	Schedule for Implementation	Estimated Budget (US\$)	Institutional Responsibility
Positive Impacts						
8.1	Economy • Generation of electricity	Not applicable				
9.4	Groundwater: • Water supply for the Project during the operations phase is anticipated to be derived from groundwater. This may have an effect on other waters users.	To prevent the contamination of surface and groundwater and to not negatively affect other water users.	1. continuous monitoring of affected village supplies and a cessation of project abstraction if the groundwater elevation in village water supply wells reaches a pre-agreed level. 2. water storage solutions (eg tanks) for water pumped during the wet season for use during the dry season.	Regularly throughout operations	Ongoing monitoring costs to be confirmed	ProjectCo Project Manager
9.6	Landscape and Visual Amenity • Impact from solar reflection	Minimise the visual impact on surrounding sensitive receptors	1. Rehabilitation of all disturbed areas (e.g. temporary access tracks and laydown areas) must be undertaken following construction. This must be done in such a way facilitate natural regeneration of vegetation; and 2. Maintain ongoing engagement between the Project and local communities with regards to potential solar reflection impacts.	Regularly throughout operations	No additional costs required.	ProjectCo Project Manager
9.8	Access restrictions • The presence of a fenced solar site may block access of pathways that transect the solar site	Avoid disruption to pathways transecting the site	1. Undertake consultation with communities using farmland in areas affected during operation to establish the best alternative routes and measures that the Project should put in place to minimize impacts related to access restrictions.	Regularly throughout operations	As part of ProjectCo's operational costs	ProjectCo Project Manager CLO
9.11	Community safety and security • Safety hazards may arise from trespassers into the solar farm and those that illegally try to connect to the transmission line.	Avoid incidents related to trespassers and opportunists attempting to steal panels or illegally connect to the transmission line	1. Security personnel will comply with Malawian laws and regulations as well as the requirements of the Voluntary Principles for Security and Human Rights. The security will include, among other things, selection of personnel based on a careful background screening, and monitoring of performance. 2. Establish clear and visible signage in operational areas to warn the community of any risks and hazards. 3. Establish a community engagement programme to provide information about safety hazards and raise awareness of how these are being managed. This includes visits to all neighbouring communities and local schools. 4. Raise awareness to communities regarding the Grievance Mechanism to deal with community concerns and issues in a timely manner to avoid issues escalating. This will include the use of a Community Liaison Officer who will be present around the Project site during operation.	Regularly throughout operations	Quarterly Audit Reports by the ProjectCo	1,2) ProjectCo Project Manager 3,4) CLO
9.12	Labour and working conditions • The workforce may be subject to poor labour and working conditions	Avoid risks associated with labour and working conditions	o Refer to <i>Section 9.12.5</i> for mitigation measures	Regularly throughout operations	Quarterly Audit Reports by the ProjectCo	ProjectCo Project Manager
9.13	Unplanned Events: Spill events leading to land contamination, soil	Minimise the impact of	1. The Project will implement a Hazardous Spill Response Plan (HSRP) and maintain spill clean-up and response capability adequate for addressing spills for all phases of the Project. All spills will be immediately contained and cleaned up. Contaminated areas will be remediated.	Regularly throughout operations	As part of ProjectCo's operational costs	ProjectCo Project Manager

Ref	Potential Impact Managed/Enhanced	Objective	Mitigation/Enhancement Measures	Schedule for Implementation	Estimated Budget (US\$)	Institutional Responsibility
	and groundwater contamination	unplanned spillage events	<ol style="list-style-type: none"> 2. The Project will implement and Waste Management Plan. 3. Hazardous material storage will be on hard standing and impermeable surface and the storage facility will be bunded. The Project will restrict storage and handling of hazardous materials and fuels to bunded areas of sufficient capacity to contain a release. 			

10.5.6

Decommissioning

A detailed decommissioning and rehabilitation plan must be developed prior to decommissioning the solar PV plant and associated infrastructure. This plan should include, but not be limited to, management of socio-economic aspects such as employment loss, removal, re-use and recycling of materials and vegetative rehabilitation to prevent erosion.

The decommissioning activities will be similar to construction activities and therefore recommendations outlined to manage construction phase impacts should be adhered to during decommissioning. Management actions should focus on the rehabilitation of disturbed areas and the removal of infrastructure.

However it is important to note that the ProjectCo and ESCOM may agree to trigger a clause in the PPA which would simply extend the term beyond 20 years. Therefore, it is possible the plant will operate beyond a 20 year life span. Furthermore, the land leases for the Project are for 50 years.

10.6

ENVIRONMENTAL AND SOCIAL MONITORING PLAN

ProjectCo will undertake environmental and social monitoring during the construction and operation phases. The monitoring commitments are included in *Table 10.3 and Table 10.4*.

Table 10.3 Construction Environmental and Social Monitoring Procedures

Ref	Potential Impact Managed/Enhanced	Objective	Monitoring Indicator	Monitoring Frequency	Estimated Budget (US \$)	Institutional Responsibility
Positive Impacts						
8.1	Employment and the Economy <ul style="list-style-type: none"> Employment opportunities and the need for the supply of goods and services has the potential to create jobs for the local community and improve income levels. 	Provide opportunities to local communities to enhance income levels, skills/employability and improve the quality of life.	<ul style="list-style-type: none"> Number of males and females employed from project affected communities Number of males and females employed from Salima Number / type / location of suppliers of goods and services Review of economic trends through baseline monitoring (community level and district level - in Salima) 	Quarterly reporting by ProjectCo	<ul style="list-style-type: none"> Review of numbers to be embedded in the EPC contractor scope of work USD 10,000 for review of recruitment performance 	1,2,4).ProjectCo Project Manager 3) EPC Contractor Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Commissioner to undertake review of quarterly ProjectCo monitoring report
Adverse Impacts						
9.1	Air Pollution: <ul style="list-style-type: none"> Site preparation, construction activities, equipment, material and worker transportation will generate fugitive dust emissions which could act as a nuisance for nearby sensitive receptors. 	Minimise deterioration of ambient air quality from construction activities	<ul style="list-style-type: none"> Daily visual inspection logs Audit report Grievances logged 	Daily visual inspection Quarterly audit reporting by ProjectCo	Ongoing maintenance costs included within the EPC Contractor's bid	1-12) EPC Contractor 13) ProjectCo CLO and EHS Coordinator Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.2	Noise Pollution <ul style="list-style-type: none"> Site preparation, construction activities, equipment, material and worker transportation will generate fugitive dust emissions which could act as a nuisance for nearby sensitive receptors. 	To avoid disturbance to surrounding land-users by maintaining noise levels within required limits (55 dBA during the day time (07:00- 22:00) and 45 dBA during the night time (22.00 - 07.00))	<ul style="list-style-type: none"> Grievances logged Equipment/vehicle inspection logs Equipment/vehicle manuals Audit Report 	Daily visual inspection Quarterly audit reporting by ProjectCo	1-4) Ongoing costs included in the EPC contractor's bid CLO to be hired as part of ProjectCo's operational budget	1-5) EPC Contractor 5) ProjectCo EHS Coordinator and CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.3	Soil Erosion <ul style="list-style-type: none"> Loss of arable soils and reduced soil quality. 	To avoid soil erosion and the consequent loss of soil quality and quantity.	<ul style="list-style-type: none"> Daily visual inspection logs Audit report Grievances logged 	Daily visual inspection Quarterly reporting by ProjectCo	Ongoing costs included in the EPC contractor's bid	1) As per section above 2,3) EPC Contractor Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.4	Groundwater Resources	To prevent the contamination of surface and groundwater and to not negatively	<ul style="list-style-type: none"> Monitoring Report 	Monthly reporting by ProjectCo	USD 15,000 for monitoring and assessment programme	1-5) ProjectCo Project Manager

Ref	Potential Impact Managed/Enhanced	Objective	Monitoring Indicator	Monitoring Frequency	Estimated Budget (US \$)	Institutional Responsibility
Positive Impacts						
	<ul style="list-style-type: none"> Water supply for the Project during the construction phase is anticipated to be derived from the groundwater. This may have an effect on other waters users. 	affect other water users in terms of water availability.	<ul style="list-style-type: none"> Grievances logged Evidence of water storage solutions 		Embedded controls part of design costs for Project	<p>Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator</p> <p>EAD to undertake quarterly review of ProjectCo monitoring report</p>
9.5.1	Biodiversity <ul style="list-style-type: none"> Loss of Habitats and Fauna Disturbance 	Minimise impacts on terrestrial flora, fauna and avifauna during construction.	<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) Audit Reports 	Quarterly reporting by ProjectCo	1,2,4) EPC Contractor actions as part of EPC construction costs 3) Code of Conduct: 1000 USD	1,2,4) EPC Contractor 3) ProjectCo Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.5.2	Biodiversity <ul style="list-style-type: none"> Loss of Threatened Flora 	Minimise impacts on terrestrial flora during construction.	<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) Audit Reports 	Quarterly reporting by ProjectCo	1,2,3) EPC Contractor actions as part of EPC construction costs 4) Code of Conduct: 1000 USD	1,2,3) EPC Contractor 4) ProjectCo Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.5.3	Biodiversity <ul style="list-style-type: none"> Risk of Increased Invasive Alien Plants 		<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) Audit Reports 	Quarterly reporting by ProjectCo	Ongoing costs included in the EPC contractor's bid	EPC Contractor Quarterly Reports of EPC to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.5.4	Biodiversity <ul style="list-style-type: none"> Disruption of Ecosystem Services 		<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) Audit Reports Grievances logged 	Quarterly reporting by ProjectCo	1,3) Ongoing costs included in the EPC contractor's bid 2) Part of CLO responsibilities	1,3) EPC Contractor 2) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.6	Landscape and Visual Amenity <ul style="list-style-type: none"> Impact on the visual character of the landscape 	Minimise the visual impact on surrounding sensitive receptors	<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) Audit Reports 	Quarterly reporting by ProjectCo	Ongoing costs included in the EPC contractor's bid	EPC Contractor Quarterly Reports of EPC activities to be undertaken by ProjectCo EHS Coordinator

Ref	Potential Impact Managed/Enhanced	Objective	Monitoring Indicator	Monitoring Frequency	Estimated Budget (US \$)	Institutional Responsibility
Positive Impacts						
			<ul style="list-style-type: none"> Grievances logged 			District Environmental Officer to undertake review of quarterly ProjectCo monitoring report
9.7	Land acquisition and displacement <ul style="list-style-type: none"> Land clearance, causing economic displacement, in particular of subsistence farmers and land for livestock grazing. Displacement of one structure used for a goat farmer in the wayleave. The structure is not used for residential purposes. 	Avoid and minimise displacement as well as a mitigate negative impacts and enhance positive impacts	<ul style="list-style-type: none"> Livelihood Restoration Plan 	A monitoring plan will be included in the LRP. Quarterly reporting by ProjectCo	LRP development USD 60,000 LRP implementation to be determined	ProjectCo is responsible for the development and implementation of the LRP. Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Commissioner to undertake review of quarterly ProjectCo monitoring report
9.8	Access restrictions <ul style="list-style-type: none"> The presence of construction equipment and activities during this period may block pathways that transect the solar site, including access to communities and farmland 	Minimise restrictions to existing pathways transecting the Project site	<ul style="list-style-type: none"> Meeting minutes with affected communities to determine and avoid access restrictions Grievances Logged 	Quarterly reporting by ProjectCo	As part of CLO Responsibilities	ProjectCo CLO Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Lands Officer to undertake review of quarterly ProjectCo monitoring report
9.9	Vector borne and communicable diseases <ul style="list-style-type: none"> Construction equipment and activities have the potential to create dust emissions and create breeding grounds for vector borne illnesses affecting communities living in villages adjacent to the solar site. Additionally the presence of the workforce during this period in combination with poor sanitary conditions has the potential to increase communicable diseases 	Avoid the risk of increasing prevalence of vector borne and communicable diseases	<ul style="list-style-type: none"> Health Statistics Grievances logged Incident Records Worker Code of Conduct 	Quarterly reporting by ProjectCo	1,3,4,5,6,7,8) Part of EPC contractor bid 2) Project : USD 2000	1,3,4,5,6,7,8) EPC contractor 2) ProjectCo Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Health Officer with support from the officers from the Ministry of Gender to undertake review of quarterly ProjectCo monitoring report
9.10	STI/HIV transmission	Avoid an increase in STI/HIV transmission and worker-community interaction and increase in GBV / inappropriate sexual interaction in communities	<ul style="list-style-type: none"> STI/HIV prevalence records Grievances Logged Health worker outreach reports and number of people targeted by providers Number of condoms distributed Assessment of NGOs addressing GBV and other gender issues Impact monitoring of selected NGO 	Quarterly reporting by ProjectCo	STI Management Plan: USD 6,000 Support for NGO USD 10,000 Implementation has part of ProjectCo's costs	1-2) ProjectCo Quarterly Reports of ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Health Officer with support from the officers from the Ministry of Gender to undertake review of quarterly ProjectCo monitoring report
9.11	Community safety and security <ul style="list-style-type: none"> Security risk in relation to petty crime, increased GBV and perceptions that people in the communities are benefitting more than others creating tensions. 	Avoid risks associated with safety and security	<ul style="list-style-type: none"> Incident records Grievances Logged Meeting minutes from community engagement, including registers, photos and communication materials 	Quarterly reporting by ProjectCo	1,3,4) as part of EPC contractor bid. 2,5,6) Part of CLO responsibilities	1,3,4) EPC contractor 2,5,6) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator

Ref	Potential Impact Managed/Enhanced	Objective	Monitoring Indicator	Monitoring Frequency	Estimated Budget (US \$)	Institutional Responsibility
Positive Impacts						
	<ul style="list-style-type: none"> Worker-community interactions, including the presence of security may pose a threat to the community. 					District Health Officer with support from the officers from the Ministry of Gender to undertake review of quarterly ProjectCo monitoring report
9.12	Labour and working conditions <ul style="list-style-type: none"> During peak construction the workforce may be subject to poor labour and working conditions. 	Avoid risks associated with labour and working conditions	<ul style="list-style-type: none"> Worker grievance reported Incident records Grievances Logged EPC/contractor contracts Health and safety training records STI training records Gender Development Plan Recruitment statistics 	Quarterly reporting by ProjectCo	HR Policy: USD 2000 Gender Development Plan: USD 7000 Engagement activities part of CLO responsibilities	1,2,5) ProjectCo 3,4,6,7,8,9,10,12) EPC Contractor 11) ProjectCo CLO Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Commissioner to undertake review of quarterly ProjectCo monitoring report
9.13	Unplanned Events: <ul style="list-style-type: none"> Spill events leading to land contamination, soil and groundwater contamination 	Minimise the impact of unplanned spillage events	<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) including of hazardous material and waste containment and clean up kits. Audit Report Grievances Logged Incident Report Waste Management Plan Hazardous Spill Response Plan 	Quarterly Audit Reports by the ProjectCo	Costs for Plans, emergency spill kits and clean-up activities included in EPC contractor's bid.	1-4) EPC Contractor Quarterly Reports of EPC activities to be undertaken by ProjectCo EHS Coordinator EAD to undertake review of quarterly ProjectCo monitoring report
9.13	Unplanned Events: <ul style="list-style-type: none"> Traffic Accidents 	Reduce risk for traffic accidents impacting community health and safety	<ul style="list-style-type: none"> Daily visual inspection logs (including photographic evidence) including of hazardous material and waste containment and clean up kits. Audit Report Grievances Logged Incident Report 	Quarterly Audit Reports by the ProjectCo	Traffic Management Plan USD 7000 Engagement as part of CLO responsibilities Driver training as part of EPC contractor bid.	1,2,3,5,6,7) ProjectCo 4) EPC Contractor Quarterly Reports of EPC and ProjectCo activities to be undertaken by ProjectCo EHS Coordinator District Commissioner to undertake review of quarterly ProjectCo monitoring report

Table 10.4 Operational Environmental and Social Monitoring Procedures

Ref	Potential Impact Managed/Enhanced	Objective	Monitoring Indicator	Monitoring Frequency	Estimated Budget (US\$)	Institutional Responsibility
Positive Impacts						
8.1	Economy <ul style="list-style-type: none"> • Generation of electricity 	Not applicable				
Adverse Impacts						
9.4	Groundwater: <ul style="list-style-type: none"> • Water supply for the Project during the operations phase is anticipated to be derived from groundwater. This may have an effect on other waters users. 	To prevent the contamination of surface and groundwater and to not negatively affect other water users.	<ul style="list-style-type: none"> • Monitoring Report • Grievances logged • Evidence of water storage solutions 	Bi-annual Audit Reports by the ProjectCo	Ongoing monitoring costs to be confirmed	ProjectCo Project Manager EAD to undertake review of annual ProjectCo monitoring report
9.6	Landscape and Visual Amenity <ul style="list-style-type: none"> • Impact from solar reflection 	Minimise the visual impact on surrounding sensitive receptors	<ul style="list-style-type: none"> • Audit Reports • Grievances logged 	Bi-annual Audit Reports by the ProjectCo	No additional costs required.	ProjectCo Project Manager EAD to undertake annual review of annual ProjectCo monitoring report
9.8	Access restrictions <ul style="list-style-type: none"> • The presence of a fenced solar site may block access of pathways that transect the solar site 	Avoid disruption to pathways transecting the site	<ul style="list-style-type: none"> • Meeting minutes with affected communities to determine and avoid access restrictions • Grievances logged 	Bi-annual Audit Reports by the ProjectCo	As part of ProjectCo's operational costs	ProjectCo Project Manager CLO District Commissioner to undertake review of annual ProjectCo monitoring report
9.11	Community safety and security <ul style="list-style-type: none"> • Safety hazards may arise from trespassers into the solar farm and those that illegally try to connect to the transmission line. 	Avoid incidents related to trespassers and opportunists attempting to steal panels or illegally connect to the transmission line	<ul style="list-style-type: none"> • Incident reports • Community engagement records, including registers, photos and communication materials • Signage in hazardous locations • Audit Reports • Grievances logged 	Bi-annual Audit Reports by the ProjectCo	Quarterly Audit Reports by the ProjectCo	1,2) ProjectCo Project Manager 3,4) CLO District Commissioner to undertake review of annual ProjectCo monitoring report
9.12	Labour and working conditions <ul style="list-style-type: none"> • The workforce may be subject to poor labour and working conditions 	Avoid risks associated with labour and working conditions	<ul style="list-style-type: none"> • Refer to <i>Section 9.12.5</i> 	Bi-annual Audit Reports by the ProjectCo	Quarterly Audit Reports by the ProjectCo	ProjectCo Project Manager District Commissioner to undertake review of annual ProjectCo monitoring report
9.13	Unplanned Events: Spill events leading to land contamination, soil and groundwater contamination	Minimise the impact of unplanned spillage events	<ul style="list-style-type: none"> • Annual review of Plans • Incident reports • 	Bi-annual Audit Reports by the ProjectCo	As part of ProjectCo's operational costs	ProjectCo Project Manager EAD to undertake review of annual ProjectCo monitoring report

10.7

IMPLEMENTATION

The Project is committed to providing resources and establishing the systems and components essential to the implementation and control of the ESMP. These include appropriate human resources and specialised skills, training programmes, communication procedures, documentation control and a procedure for the management of change.

10.7.1

Environmental and Social Management Organisation

The Project is ultimately responsible for the management and supervision of all Project activities and will have principal responsibility for implementing this ESMP and the mitigation measures.

During construction, the Project will delegate some responsibility to construction contractors. The Project will be responsible for operation but may engage contractors for certain operational aspects and in these cases, contractors would be delegated some responsibility for environmental and social performance. As a contractual requirement, the contractors will be required to demonstrate compliance of their activities against the ESMP. This includes providing resources to ensure compliance of next tier contractors and a process for emergency stop-work orders in response to monitoring triggers.

The Project will manage its contractors to ensure that this ESMP is implemented and monitored effectively through contractual mechanisms and regular direct oversight.

10.7.2

Roles and Responsibilities

The Project is committed to provide resources essential to the implementation and control of the ESMP. Resources include the appropriate human resources with specialised skills. The Project will have dedicated personnel judged to be competent on the basis of appropriate education, training, and experience to manage and oversee the EHS aspects of project construction.

Table 10.5 Environmental Management Organisation Roles and Responsibilities

Position	Responsibility
<i>The Project Team</i>	
Project Manager	Technical aspects of the Project including subcontractor supervision during construction.
EHS Coordinator	Ensuring that the Project and subcontractors operate in accordance with the applicable regulatory environment, health and safety requirements and plans. Ensure that environment, health and safety regulatory requirements are met and that ESMP requirements are properly implemented.
Community Liaison Officer (CLO)	Liaise with local communities and government regulators on the Project's behalf. Implement EHS awareness and education programmes with communities.
EPC Contractor	Responsible for subcontractor technical and EHS performance and compliance.

Supervision of subcontractor activities will be conducted by the Project Manager.

The Project's Construction Manager and EHS Coordinator will be placed locally at the Project site to supervise subcontractors during construction while the Project's Operations Manager and EHS Coordinator will supervise subcontractors during operational activities. The organisation includes a CLO whose role is crucial to the successful implementation of the ESMP and the continuation of liaison with the local community.

10.7.3 Training and Awareness

The Project will identify, plan, monitor, and record training needs for personnel whose work may have a significant adverse impact upon the environment or social conditions. The Project recognises that it is important that employees at each relevant function and level are aware of the Project's environmental and social policy; potential impacts of their activities; and roles and responsibilities in achieving conformance with the policy and procedures. Training and awareness-raising therefore forms a key element of both EHS and the expediting of this ESMP.

Key staff will, therefore, be appropriately trained in key areas of EHS management and operational control with core skills and competencies being validated on an on-going basis. The identification of training and awareness requirements and expediting of the identified training/awareness events will be the responsibility of the EHS Coordinator:

This will be achieved through a formal training process. Employee training will include awareness and competency with respect to:

- Environmental and social impacts that could potentially arise from their activities (including, air quality and noise);
- Legal requirements in relation to environmental and social performance;
- Necessity of conforming to the requirements of the EISA and ESMP, in order to avoid or reduce those impacts;
- Activity-specific training on waste management practices, documentation systems and community interactions; and
- Roles and responsibilities to achieve that conformity, including those in respect of change management and emergency response.

The EHS Coordinator is responsible for coordinating training, maintaining employee-training records, and ensuring that these are monitored and reviewed on a regular basis. The EHS Coordinator will also periodically verify that staff are performing competently through discussion and observation.

Employees responsible for performing site inspections will receive training by drawing on external resources as necessary. Training will be coordinated by the EHS coordinator prior to commissioning of the facilities. Upon completion of training and once deemed competent by management, staff will be ready to train other people.

Similarly the Project will require that each of the subcontractors institute training programmes for its personnel. Each subcontractor is responsible for site EHS awareness training for personnel working on the job sites. The subcontractors are also responsible for identification of any additional training requirements to maintain required competency levels.

10.7.4

Communication

The Project will maintain a formal procedure for communications with the regulatory authorities and communities. The EHS Coordinator is responsible for communication of EHS issues to and from regulatory authorities whenever required. The Project manager is kept informed of such communications and pertinent information arising from such interactions will be communicated to contractors through the EHS Coordinator.

The CLO will be responsible for disseminating information and coordinating community communications through the course of the Project.

The Project will implement a grievance mechanism whereby community members can raise any issues of concern. Grievances may be verbal or written and are usually either specific claims for damages/injury or complaints or suggestions about the way that the Project is being implemented. When a grievance has been brought to the attention of the Project team it will be logged and evaluated. The person or group with the grievance is required to present grounds for making a complaint or claiming loss so that a proper and informed evaluation can be made.

Where a complaint or claim is considered to be valid, then steps are required to be undertaken to rectify the issue or agree compensation for the loss. In all cases the decision made and the reason for the decision will be communicated to the relevant stakeholders and recorded. Where there remains disagreement on the outcome then an arbitration procedure may be required to be overseen by a third party (eg government official). Local community stakeholders will be informed on how to implement the grievance procedures.

10.7.5 *Documentation*

The Project will control EHS documentation, including management plans; associated procedures; and checklists, forms and reports, through a formal procedure. All records will be kept on site and will be backed up at offsite locations (including secure cloud storage facilities). Records will be kept in both hard copy and soft copy formats. And all records will be archived for the life of the project.

The EHS Coordinator is responsible for maintaining a master list of applicable EHS documents and making sure that this list is communicated to the appropriate parties. The EHS Coordinator is responsible for providing notice to the affected parties of changes or revisions to documents, for issuing revised copies and for checking that the information is communicated within that party's organisation appropriately.

The subcontractors will be required to develop a system for maintaining and controlling its own EHS documentation and describe these systems in their respective EHS plans.

10.7.6 *Managing Changes to Project Activities or Project Setting*

Changes in the Project may occur due to unanticipated situations. Adaptive changes may also occur during the course of the project life cycle. The Project will implement a formal procedure to manage changes in the Project that will apply to all project activities.

The objective of the procedure is to ensure that the impact of changes on the health and safety of personnel, the environment, plant and equipment are identified and assessed prior to changes being implemented.

10.8 CHECKING AND CORRECTIVE ACTION

10.8.1 Introduction

Checking includes inspections and monitoring as well as audit activities to confirm proper implementation of checking systems as well as effectiveness of mitigations. Corrective actions include response to out-of-control situations, non-compliances, and non-conformances. Actions also include those intended to improve performance.

10.8.2 Inspection

EHS inspections will be conducted weekly on an *ad hoc* basis and formally at least once every six months. The results of the inspection activities will be reported to the Project management to be addressed.

10.8.3 Monitoring

Monitoring will be conducted to ensure compliance with regulatory requirements as well as to evaluate the effectiveness of operational controls and other measures intended to mitigate potential impacts. Monitoring parameters are included in the ESMP.

In addition, lender requirements may include other forms of external monitoring as specified by the lending institution.

All key monitoring activities will be undertaken by the ProjectCo and recorded. Any monitoring and inspection from government authorities will be agreed to prior to construction.

10.8.4 Auditing

Beyond the routine inspection and monitoring activities conducted, audits will be carried out internally by the Project to ensure compliance with regulatory requirements. Audits to be conducted will also cover the subcontractor self-reported monitoring and inspection activities. The audit shall be performed by qualified staff and the results shall be reported to the Project management to be addressed.

The audit will include a review of compliance with the requirements of the ESIA and ESMP and include, at a minimum, the following:

- Completeness of EHS documentation, including planning documents and inspection records;
- Conformance with monitoring requirements;

- Efficacy of activities to address any non-conformance with monitoring requirements; and
- Training activities and record keeping.

There will also be a cycle of audits into specific areas or activities of the Project. The frequency of audits will be risk based and will vary with the stage of the Project and will depend on the results of previous audits.

10.8.5 *Corrective Action*

Impacts will be identified and associated risks addressed before an incident occurs. Investigating a 'near miss' or actual incident after it occurs can be used to obtain valuable lessons and information that can be used to prevent similar or more serious occurrences in the future.

The Project will implement a formal non-compliance and corrective action tracking procedure for investigating the causes of, and identifying corrective actions to, accidents or environmental or social non-compliances. This will ensure coordinated action between the Project and its subcontractors. The EHS coordinator will be responsible for keeping records of corrective actions and for overseeing the modification of environmental or social protection procedures and/or training programs to avoid repetition of non-conformances and non-compliances.

10.8.6 *Reporting*

If required, the Project will provide appropriate documentation of EHS related activities, including internal inspection records, training records, and reports to the relevant authorities. Subcontractors are also required to provide EHS performance reporting to the Project on a regular basis through weekly and monthly reports. These will be used as inputs to the above.

Quarterly and annual monitoring reports will be provided to various government authorities as requested.

This is the ESIA Report for the construction and operation of a 60 MW solar PV project and 4km transmission line in Salima, Malawi. The ESIA has been conducted to evaluate the impacts associated Project in accordance with international best practice (such as the IFC PS) and national legislative requirements.

11.1

IMPACTS REQUIRING DETAILED ASSESSMENT

Following a Scoping exercise, this IA was focussed on interactions between the Project activities and various resources/receptors that could result in significant impacts. *Table 11.1* presents the outcomes of the comprehensive assessment of identified impacts as a result of the various phases of the Project. Impacts are classified as *negligible to moderate* significance, with the implementation of mitigation measures captured within the ESMP Framework table; there are no residual impacts of *major* significance.

Positive impacts are expected through the employment of up to 200 people for the construction activities. Up to 20 people are expected to be employed during the operational activities associated with the ongoing maintenance requirements. Enhancement measures have been included in the ESIA to maximise on positive impacts. In addition, the generation of electricity will be a significant positive impact for the country.

Table 11.1 Summary of Impact Assessment Findings

Potential Impact	Project Phase	Significance (Pre-mitigation)	Residual Significance (Post-mitigation)
Generation of electricity	Operation	Positive	Positive
Employment and economy	Construction and Operation	Positive	Positive
Nuisance and impact to air quality from dust emissions	Construction	Moderate	Minor
Nuisance from construction noise	Construction	Moderate	Minor
Soil erosion and reduced soil quality	Construction	Moderate	Minor
Reduction in groundwater quality and availability	Construction	Moderate	Minor
Biodiversity- loss of habitat and faunal disturbance	Construction	Minor	Negligible
Biodiversity- loss of threatened flora	Construction	Moderate	Minor
Biodiversity- risk of increased invasive alien plants	Construction	Minor	Negligible
Biodiversity-disruption of ecosystem services	Construction	Moderate	Minor
Change in landscape and visual amenity	Construction	Moderate	Minor
Change in landscape and visual amenity from solar reflection	Operation	Moderate	Minor
Physical and economic displacement from project land take	Construction	Major	Minor
Access restrictions from project land take	Construction and Operations	Moderate	Minor
Increased risk of vector borne or communicable diseases	Construction	Minor	Negligible
Increase risk in STI/HIV transmission	Construction	Minor	Negligible
Increase risk to community safety and security	Operation	Minor	Negligible
Increase risk to community safety and security	Operation	Moderate	Minor

There is always the potential for unplanned events such as spills/ improper disposal of waste and traffic accidents. These have been identified (see *Section 9.13*) and preventative measures will be put in place to reduce the likelihood of these occurring. With these measures in place the likelihood and risk of the event will be reduced significantly.

Impact monitoring and management costs are divided between the ProjectCo and the EPC contractor. The management and monitoring tables in *Section 10* allocated responsibility for the costs. Many of the costs will form part of the EPC contractor's day to day activities during construction and therefore will form part of the costs. Where additional items are required for the production of plans or monitoring activities, the responsibility and estimated costs are allocated.

The ProjectCo are planning to develop a 60 MW PV plant on a 168 ha land plot in Salima District situated in the Central Region of Malawi. Accordingly the ProjectCo appointed ERM to undertake the ESIA of the Project.

An impact assessment process was undertaken in line with Malawian Environmental Management Act of 1996 and international best practice (IFC Performance Standards) by evaluating the Project activities against the existing baseline conditions at the Project site in Salima District, Central Malawi. A Scoping Report was submitted in June 2018 and disclosed to the lenders. The purpose of the Scoping Report was to identify the potential interactions between the Project related activities and the existing environmental and social resources/receptors and to prioritise the scope of work for the ESIA assessment. Formal stakeholder engagement was undertaken with Government departments and project affected communities.

The Scoping Report identified a number of potential impacts that required further assessment in the ESIA stage:

- Air quality impacts (including dust).
- Noise Impacts.
- Landscape and visual amenity impacts.
- Groundwater impacts (quality and quantity).
- Soil erosion.
- Impacts on biodiversity.
- Land Acquisition and, Physical and Economic Displacement.
- Restrictions/Disruption to Access Routes.
- Temporary Influx / Community Cohesion.
- Transmission of Vector Borne or Communicable Diseases.
- Transmission of Sexually Transmitted Infections (STIs)/HIV.
- Risk to Community Safety and Security.
- Unfair/unsafe Labour and Working Conditions.
- Employment and the Economy.
- Generation of Electricity.
- Unplanned Events.

Following the Scoping phase, an ESIA was undertaken. This ESIA assessed the impacts described in the bullet list above. The assessment demonstrated that, with the implementation of committed mitigation measures during the construction and operational activities of the Project, the majority of impacts are of *moderate or minor significance*. The following impacts were identified to have *major* significance prior to mitigation:

- Land acquisition and, physical and economic displacement.

- Land and groundwater contamination from unplanned spills/improper disposal of waste; and
- Traffic accidents.

Mitigation and preventive measures have been included within the ESMP which will minimise the potential negative impacts and the residual risk remains of moderate or minor significance. Positive impacts are expected from the creation of local employment opportunities during the construction phase, capacity building and economic development as well as long term local employment opportunities through on the job training and capacity development. Enhancement measures have been proposed to maximise the potential positive benefits. In addition, the generation of electricity will have a significant positive impact on Malawi.

The land acquisition for the Project has been undertaken in two phases. Phase I refers to an initial 80 ha plot of land (government-led land acquisition process already completed) and Phase II refers to additional 88 ha plot of land (land acquisition process in progress). The land acquisition process for Phase I was led by the Salima District Office and undertaken at the end of 2017. 72 people were compensated by Phase I of land acquisition: 50 people in Kanzimbe Village (24 males and 26 females) and 22 people in Mayambo Village (8 males and 14 females). In terms of Phase II, a total of 166 people are impacted (77 males and 89 females).

As there is only economic resettlement, a Livelihood Restoration Plan (LRP) will be developed in parallel with the ESIA. The plan will set out the extent and scale of displacement impacts, engagement related to land acquisition, eligibility and entitlements for affected persons and the implementation, monitoring and evaluation requirements.

In summary, ProjectCo is committed to working with the local community and authorities during the construction and operation of the Project and will maintain open dialogue as part of their ongoing stakeholder engagement activities. On the basis and the basis of the whole ESIA, it is recommended the Project continue as planned.

Annex A

Project Team CV's

Nicky Crawford

Partner

Nicky Crawford joined ERM in April 2001 and with over 17 years' experience is a Partner in ERM's London Office.

Throughout her time at ERM, Ms Crawford has led numerous high-profile Environmental and Social Impact Assessments for complex, and sometimes controversial projects in various countries. Nicky has a thorough understanding of the Equator Principles and the IFC Performance Standards, having applied them to numerous projects in both an impact assessment context and an environmental and social due diligence context.

Within the Power Sector, Nicky has worked in various fields including solar, wind, gas, coal, HFO, diesel, and biomass, along with other related infrastructure such as transmission lines, substations, gas pipelines, road and rail links, underground gas storage and CCS (carbon capture and storage).

Nicky has a responsibility for ERM's work in the Power Sector in Africa coordinating the work of various ERM offices across the EMEA region, maximising the collaboration, knowledge sharing and innovation between the teams, and most importantly ensuring that our clients are serviced with the best and most experienced team of consultants.



Professional Affiliations & Registrations

- Associate member of the Institute of Chemical Engineers

Fields of Competence

- Environmental & Social Impact Assessments
- Environmental & Social Due Diligence
- Environmental Permit Applications

Education

- BEng (Hons) Chemical Process Engineering, University of Sheffield
- MSc Integrated Pollution Control, Middlesex University

Languages

English (native), Spanish (fluent), French (basic), Arabic (beginners), Turkish (beginners)

Key Industry Sectors

- Power (renewables & thermal)
- Infrastructure
- Oil and Gas
- Waste Incineration

Publications

The Interaction Between Land Use Planning and Environmental Regulation, Scottish Executive Development Department, Social Research, October 2004, with Raymond, K. and Mitchell, A.

Key Projects

Environmental and Social Red Flags Report for a Solar Plant in Botswana, Confidential Client, 2018

ERM have undertaken an environmental and social red flags review of this proposed solar plant in Botswana. Key E&S risks have been identified in order to inform the client's investment committee decisions.

Environmental and Social Impact Assessment of a Solar plant in Malawi, JCM Matswani Solar Corp, 2018 - ongoing

Nicky is the Partner in Charge for this ESIA for a 20 - 40 megawatt (MW) solar photovoltaic (PV) plant in Salima District situated in the Central Region of Malawi. ERM are also preparing a Livelihood Restoration Plan and have been supporting on Community Investment Strategy.

Environmental and Social Red Flags Report for a Solar Plant in Ukraine, Confidential Client, 2018

ERM have undertaken an environmental and social red flags review of this proposed solar plant in Ukraine. Key E&S risks have been identified in order to inform the client's investment committee decisions.

ESG Manager for Climate Fund Managers, The Netherlands, 2016-2017

Nicky spent 10 months on a part-time secondment as ESG Manager for Climate Fund Managers (CFM) a fund investing and developing renewables projects in Africa and Asia. During this time Nicky, supported by her team at ERM have assisted CFM with the development of their Environmental & Social Management System (ESMS) and supporting risk management tools, delivered training on E&S issues for renewables projects, supporting on fund-raising applications and interviews. ERM undertook high-level environmental & social screening assessment for solar projects, wind (onshore and nearshore), geothermal and run-of-river hydro to feed into investment committee decision making. ERM are now supporting on community investment strategy.

Noise and Biodiversity studies for a wind farm in Ghana, Confidential Client, 2016.

ERM undertook some noise modelling of this proposed wind farm in Ghana to assess various turbine layouts and turbine manufacturers. In addition, ERM have undertaken some desktop studies on bats in order to satisfy lender requirements. Nicky was Partner-in-Charge for this project.

Environmental and Social Support for a solar PV plant in Benban, Egypt, Confidential Client, 2016

ERM was commissioned to support a solar PV developer in the identification of gaps in the requirements to meet lender requirements. Nicky was Partner-in-Charge for this project.

ESIA for Thermal Power Plant, Ivory Coast, Globeleq Advisors/Azito Energie 2016 - 2018.

ERM prepared the Environmental and Social Impact Assessment (ESIA) for the expansion of a gas-fired power plant in Abidjan, Ivory Coast. This impact assessment was prepared to meet international finance standards, i.e. IFC's Performance Standards, as well as local Ivory Coast regulatory requirements. The ESIA and associated Environmental and Social Management Plan (ESMP) were of a high, professional standard and are now being used as examples of best-in-class for other ESIA's and ESMP's being prepared for the client. Nicky was Partner in Charge for part of this project.

Environmental and Social Due Diligence of an HFO Plant in Mali, Confidential Client 2016

ERM undertook an Environmental and Social due diligence of a proposed HFO plant in Mali. Nicky was Partner-in-Charge for this project.

Environmental and Social Impact Assessment of an LNG Storage and Regasification Terminal in Gibraltar, Royal Dutch Shell, 2015-2016

Nicky was Partner in Charge for this ESIA which was undertaken to meet Gibraltarian EIA requirements, International Standards, and Shell's corporate standards. Extensive stakeholder engagement was undertaken by ERM on behalf of Shell including public exhibitions and meetings with regulators and NGOs. Nicky was put forward by Shell for all the TV and media interviews and presented at the public hearing for the EIA. The EIA certificate was granted in May 2016.

Environmental and Social Impact Assessment of Gaziantep Integrated Healthcare Campus, Turkey, Samsung C&T Corporation, 2015-2016

Nicky was Partner in Charge for this ESIA for the Gaziantep IHC, done to International standards in order to meet the requirements of lenders including EBRD, EIB, SMBC and KEXIM. Social issues were particularly complex for this project due to presence of significant numbers of Syrian refugees in Gaziantep.

Air Quality Assessment for the Kipone Independent

Power Plant in Ghana, Cenpower, 2016.

ERM are undertaking some detailed air dispersion modelling for this plant in Ghana. Nicky is Partner-in-Charge for this project.

E&S Advisory Services through Project Finance Process, Confidential Power Utility and Engineering Conglomerate, North Africa, 2015-ongoing, ERM are assisting a national utility and engineering conglomerate with negotiations with lending group and implementation of E&S commitments related to the financing of three gas-fired power generation projects in North Africa. This included overview and management of technical studies, preparation of E&S and H&S management system elements and providing high level advice on E&S components of ongoing construction and Project implementation planning. Nicky is supporting the Project Director, in particular on environmental topics including Air Quality.

Environmental and Social Gap Analysis for a gas-fired Power Station in Nigeria, Confidential Client, 2015.

ERM undertook a gap analysis of the Nigerian EIA for this proposed gas-fired power plant in order to identify gaps to bring the EIA up to International Standards. Nicky was key reviewer for the environmental issues.

Environmental and Social Impact Assessment (ESIA) for the Aboadze 400 MW CCGT Gas Power Plant, Takoradi, Ghana, Globeleq, 2015-2016.

ERM was commissioned by Globeleq to carry out an ESIA to national and international (IFC) standards for a 400 MW CCGT gas-fired thermal power generation plant to be located in Takoradi adjacent to 3 existing power plants. Cumulative environmental impacts from this plant, the existing power plant adjacent to the site, and the other proposed neighbouring power plants to be developed are a key issue. Nicky was the Environmental lead for this project.

Environmental, Social and Health Impact Assessment, Kazakhstan, TCO (Chevron), 2010-2015
Nicky led a large and complex ESHIA for an Oil & Gas development in Kazakhstan. The development

involves the construction of a port, dredging a channel in the Caspian Sea, rail upgrades, accommodation and a haul road in addition to the Oil & Gas development itself. The ESHIA was carried out to International Standards.

Preparation of an Environmental Permit Application, UK, 2CO Energy, 2010

ERM led on EIA, safety and risk services, due diligence, contaminated site investigation and sustainability, climate change services and environmental permitting for a proposed Integrated Gasification Combined Cycle (IGCC) with carbon capture and storage (CCS). Nicky led the permitting piece of work.

Renewable Energy National Policy Statement - Energy from Waste and Biomass, UK Department for Energy and Climate Change 2009.

Ms Crawford was one of authors of the Energy from Waste and Biomass sections of the Renewable Energy National Policy Statements which was prepared on behalf of DECC.

Environmental and Social Impact Assessment of a proposed underwater tree salvaging in Volta Lake, Ghana, CSRD, 2007 - 2008

ERM prepared an ESIA for this project involving the harvesting of underwater trees from the Volta Lake and the onshore manufacturing and processing of this lumber. This project is to be designed to meet IFC standards. Nicky developed the project description and was responsible for liaising with the engineering teams.

Preparation of an Environmental Permit Application, Veolia, UK 2007-2009

ERM compiled the Environmental Permit Application for this proposed Energy Recovery Facility in Shropshire. ERM also undertook the air quality assessments and the Human Health Risk Assessment for inclusion in both the EP application and the EIA for this development. Compliance with the Waste Incineration Directive was demonstrated in the Application. Ms Crawford managed the application process and undertook the BAT assessment.

Preparation of an Environmental Permit Application, UK SITA, 2006-2008.

Nicky managed the compilation of Environmental Permit Application for this proposed Residual Waste Treatment Plant in Cornwall. ERM also carried out the air quality assessments and the Human Health Risk Assessment for both the EIA and EP application. Compliance with the Waste Incineration Directive was demonstrated in the Application. Nicky also undertook a staged BAT assessment of the abatement technology.

Environmental Impact Assessment of Whitehill Underground Gas Storage Project, UK, E.ON, 2006 - 2007

Nicky managed this complex EIA for an underground gas storage facility in East Riding of Yorkshire. Several other organisations and subcontractors contributed to this EIA. In addition to the underground gas facility, the EIA included the assessment of various gas pipelines and an offshore brine inlet and discharge.

Preparation of PPC Permit Application, OESCO Power Plant, Gibraltar, 2005-2008.

Ms Crawford managed the PPC permit application for this small power station. Emissions of NO_x, noise levels, BAT, monitoring and site condition are all issues of concern for this installation. The permit application was determined by the UK EA's Special Permitting Group and the permit issued in October 2007. ERM also assisted with the implementation of the permit conditions.

Preparation of a PPC Permit Application for a Power Plant, Uskmouth Power Company, 2004-2007.

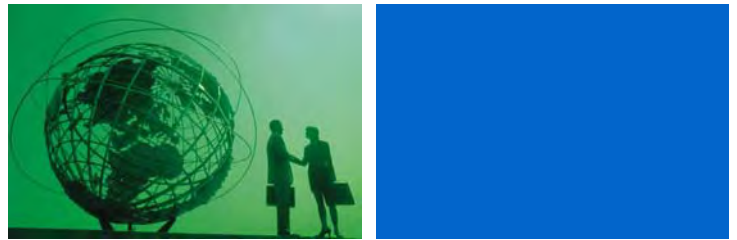
Nicky managed the preparation of a PPC permit application for this existing coal-fired power station in South Wales. The requirements of the Large Combustion Plant Directive were demonstrated. The PPC application included the assessment of Best Available Techniques (BAT), a cost benefit analysis of the abatement equipment using the Environment Agency's software H1.

Environmental Impact Assessment of the Installation of Flue Gas Desulphurisation to Fiddler's Ferry Power Station, Scottish and Southern Energy, 2005.

Ms Crawford managed the EIA for the Section36 application to the DTi for the installation of FGD to Fiddler's Ferry coal-fired power station. In order to meet the requirements of the Large Combustion Plant Directive FGD was required to reduce emissions of sulphur dioxide.

Brendon Solik

Senior Consultant



Brendon Solik is a Consultant with ERM Johannesburg, South Africa. Since joining ERM in March 2014 he has undertaken project management, advisory and coordination, field work, and research and report writing for major oil and gas, power, infrastructure, and mining projects located in Ethiopia, Mozambique, South Africa, Burundi, Ghana, Malawi, Nigeria, Sierra Leone, Botswana, Namibia, and Angola.

Brendon has 5 years' experience in environmental and social consulting. As part of project work conducted Brendon has undertaken site screening assessments, environmental and social baseline data collection and has interacted with local communities and government authorities. In addition, Brendon has written management plans for major capital projects as part of the ESIA process and as standalone projects in order to help clients close out projects. The majority of the projects Brendon has been involved in have been conducted to International Finance Corporation (IFC), Equator Principles and other lender requirements.

Brendon has key project management, coordination, and advisory skills, as well as a high level of research and analysis capability. In addition, Brendon has played a key role in health and safety planning for all project work.

Other fields of competence include; sustainability analysis, public water supply issues; water governance; and public policy.

Fields of Competence

- Project Management
- Environmental and Social Risk Advisory
- Research and Analysis
- Stakeholder Engagement
- Water governance

Key Industry Sectors

- Infrastructure Development
- Power (Thermal and Renewable)
- Oil and Gas

Countries of Work Experience

- Ethiopia
- Mozambique
- South Africa
- Burundi
- Nigeria
- Malawi
- Ghana
- Sierra Leone
- Angola
- Namibia
- Botswana

Education

- Masters of Science in Water Science, Policy and Management from the University of Oxford (2013)
- B. Soc. Sci. (Honours) in Environmental Management from the University of Cape Town (2011)
- B. Soc. Sci with Majors in Economics, Politics, and Environmental Geographical Science (2010)

Languages

- English

Key projects

(Following page)

Environmental and Social Impact Assessment for 125/22 kV Transmission Lines in Addis Ababa, CONCO, Ethiopia, 2016-Ongoing

ERM has been commissioned by Consolidated Power Projects (CONCO) to undertake two ESIA's for six transmission lines and six substations within and on the outskirts of Addis Ababa. The Project is part of a broader project to update the aging power distribution network in the City. Brendon is the PM on the project and has undertaken fieldwork for the project, coordinated key tasks, advised the client on key issues occurring on the project, as well as undertaken project analysis and report writing.

Environmental and Social Impact Assessment for 20-40 MW Solar PV facility, JCM Matswani Solar Corp Limited, Malawi, 2017-Ongoing

ERM has been commissioned to undertake a ESIA for a proposed 40 MW solar PV facility in Salima, Malawi. Brendon is the project manager and environmental consultant on the project. Key project management tasks include managing a global ERM team with consultants based in England, Kenya, and South Africa as well as in country Malawian sub contractors.

Supplemental Environmental and Social Impact Assessment for 5MW Solar PV Project, AGES Solar, Sierra Leone, 2018-ongoing

ERM was commissioned to undertake a supplemental ESIA the Project. These tasks were required to close out gaps in existing documentation for the project and to help bring the project to financial close. Brendon is the project manager and primary environmental consultant.

Environmental and Social Advisory for 5MW Solar PV facility, Gigawatt Burundi SA, Burundi, 2017-2018

ERM has been commissioned to undertake a Stakeholder Engagement Plan, Biodiversity Management Plan, and Cultural Heritage Management Plan for the solar PV Project. Brendon is the project manager on the project and has write and/or provided input into each of the plans.

Environmental Impact Assessment for a Wastewater Treatment plant and Methane Storage, Distell, South Africa, 2017- Ongoing

ERM has been commissioned to undertake a full EIA process for a waste water treatment plant and the storage of methane in a industrial area outside Johannesburg. Brendon is the Project Manager for the project and is responsible for timely delivery of the project, client liaison and quality control for project work.

Environmental and Social Management Plan (ESMP) for a 10 MW Solar PV Project, CIGenCO, Namibia, 2017- Ongoing

ERM was commissioned to undertake a gap analysis of existing permits for the project and recommend actions (in the form of the ESMP) for the client in order to be compliant with IFC Performance Standards. Brendon is the project manager and undertook the gap assessment, compilation of the ESMP, as well as sites risk assessment for the Project.

Environmental Impact Assessment for a Wastewater Treatment plant and Methane Storage, Confidential Client, South Africa, 2017- Ongoing

ERM has been commissioned to undertake a full EIA process for a waste water treatment plant and the storage of methane in a industrial area outside Johannesburg. Brendon is the project manager for the project and is responsible for timely delivery of the project, client liaison and quality control for project work.

Environmental and Social Impact Assessment for a New Petroleum Products Storage and Distribution Facility, Westron Oil and Gas Ltd, Nigeria, 2017-Ongoing

ERM has been commissioned to undertake a ESIA for a new petroleum storage and distribution facility in Lagos Nigeria. Brendon is the Project Manager for the project and is responsible for timely delivery of the project, client liaison and quality control for project work.

Environmental and Social Impact Assessment sugar Cane Syrup Mill, Ethanol Company of Malawi (Ethco), 2015-2017

ERM was commissioned to undertake an ESIA for an 1000 TPD sugar cane syrup mill in Central Malawi. The project is a greenfield development adjacent to Lake Malawi and will be undertaken to IFC and World Bank Standards. Brendon is a consultant on the project and key tasks include, overall project coordination including coordination of ERM team members and sub-contractors, and research, analysis and report writing.

Environmental and Social Management Plan for Sugar Cane Juice Mill, PressCane Corporation, Malawi, 2015- 2017

ERM has been appointed to undertake ESMP for the 65 TPH sugar cane juice mill in Southern Malawi. The ESMP will provide an overarching management system for the project and is being developed according to IFC and World Bank Standards. Brendon is a consultant on the project and has drafted the ESMP and undertaken project coordination tasks including the management of the in country survey team.

Supplemental Environmental and Social Impact Assessment, Stakeholder Engagement Plan, and Livelihoods Restoration Framework for a 100 MW Solar PV Project, Motir-Du Sable, Nigeria

ERM was commissioned to undertake a supplemental ESIA, SEP, and LRF for the Project. These tasks were required to close out gaps in existing documentation for the project and to help bring the project to financial close. Brendon was tasked with identifying gaps and writing reports for the Project as well as health and safety planning.

Environmental and Social Impact Assessment for Cement Plant, limestone Quarry, and 40 MW Power Plant, SouthPort, Nigeria, 2016- Ongoing

ERM has been commissioned to undertake an ESIA for cement plant, limestone quarry, and 40 MW power plant in Abeokuta, just north of Lagos. The plant is being constructed in an area where there are large limestone deposits and the project will serve to bolster

local supply of cement. Key tasks on the project included coordinating the infield the environmental baseline visit, report writing, and client liaison.

ESIA for the Abeokuta Gas Fired Power Plant, Nigeria, Energy Culture, 2014-2107

ERM was appointed to undertake a ESIA for the development of a 147 MW gas fired power plant in Abeokuta, Nigeria. Brendon has been involved in many aspects of the project, however primary responsibilities included, undertaking reporting, and project Management.

Environmental and Social Management Plan for Solar Project, Episolar Inc., Ghana, 2015

ERM has been appointed to compile a suite of Environmental and Social Management Plans and undertake supplemental studies for a solar client in Ghana. The plans are being developed in accordance with IFC and World Bank Standards and include a Stakeholder Engagement Plan, Emergency Response Plan, Livelihoods and Restoration Plan, and a Waste Management Plan (amongst others). Brendon was part of the site visit team and engaged with community members and local authorities with respect to the project.

Globeleq Aboadze IPP Gas Fired Power Plant ESIA, Ghana, Globeleq, 2015

ERM has been appointed to undertake the ESIA for a proposed 450 MW CCGT power plant in Ghana. Brendon has been involved in many aspects of the project, however primary responsibilities included, undertaking reporting, and project coordination.

Environmental and Social Screening Study, Confidential Power client, South Africa, 2015

ERM has been commissioned to undertake and environmental and social screening study for a potential parcel of land for development on behalf of a power client. Brendon is a consultant on the projects and key tasks include research and analysis to identify key risks in that the proposed project may encounter and communicate them to the client.

Screening and Scoping Study, Power Client, South Africa, 2015

ERM has been appointed to undertake a screening and scoping Study for a Power Client in South Africa. Brendon is the project Consultant on the project and has undertaken research and analysis into the permitting and legal requirements for the project, scoped key environmental and social issues related to the project, and provided inputs into site selection for the development.

Environmental Impact Assessment for a Floating Power Plants (Saldanha and Richards Bay), Department of Energy, South Africa, 2015- ongoing

ERM has been commissioned by the Department of Energy in South Africa to undertake an EIA for a Floating Power Plants in the Port of Saldanha and Richards Bay. The Project is part of the short term power solutions that the country is pursuing in order to meet power demand. Brendon is a consultant on both projects (for each Port). Key tasks include, project coordination, research and analysis and report writing.

Basic Assessment for an Ethanol Storage facility, Johnson and Johnson, South Africa, 2014-2015

ERM was appointed to conduct a Basic Assessment for the construction of a dangerous goods facility on their industrial site in Cape Town. Brendon is the project manager for the project and key tasks have included client liaison, site visits, and report compilation.

Eni Ghana ESHIA, Ghana, eni Ghana, 2014

ERM has been appointed to undertake Phase Two of offshore oil and gas project in Ghana. Brendon has primarily been involved in the stakeholder engagement process and was part of the team who conducted the fieldwork in Ghana. Responsibilities included, undertaking in country stakeholder engagement, baseline reporting, and project coordination.

EEA Stakeholder Engagement, Mozambique, EEA, 2014

ERM was appointed to conduct a three pronged stakeholder engagement assessment for EEA Mozambique which included a Risk Assessment, Stakeholder engagement plan and stakeholder engagement strategy. Brendon's tasks on the project include; project coordination, research and analysis, review and report compilation.

Impact Assessment for Offshore Seismic Exploration Shell BV, Namibia, 2014

ERM was appointed to conduct an Impact Assessment for offshore seismic survey in Namibia. This involved the preparation of a full impact assessment according to Namibian regulations. Brendon's tasks on the project include; baseline research, research and analysis, review and report compilation.

ESIA for Industrial Facilities for GET, Special Economic Zone, Luanda, Angola, General Electric, 2014

ERM was appointed to conduct a detailed assessment of the proposed industrial facilities for the construction and testing of electrical generators, located in Luanda, Angola. The project will have and will have a footprint of 80 000 m² and Brendon's responsibility on the project include review and quality control of the EIS Report.

Tugela South EMPr Amendment, South Africa, Exxon Mobil, 2014

ERM was appointed to conduct an EMPr amendment for the South Tugela Exploration Area off the coast of South Africa. This involved the preparation of an Environmental Management Programme (EMPr) in accordance with applicable South African requirements (i.e. the Minerals and Petroleum Resources Development Act, No. 28 of 2002) and applicable standards. Responsibilities on the project include, project coordination, research, review, and building the stakeholder database.

Confidential Project, Botswana, Confidential Client, 2014

This Project involved the gathering of site specific environmental and social baseline information and the

subsequent undertaking of detailed risk assessment within the regionally protected / sensitive area where the project is located. Brendon researched relevant information required for the baseline and then determined what historical and/or external factors would impact the project. This project allowed the client with a comprehensive non-technical risk register associated with the objectives of the project

Confidential Project, South Africa, Confidential Client, 2014

Brendon studied various project proposals for a large scale project in South Africa and then proceeded to design and write a legal roadmap to be used for decision making purposes. This involved a detailed review of the legislative framework of South African Environmental Law.

Construction of Sonaref Crude Oil Refinery and Marine Terminal, Angola, Sonangol, 2014

The project involved a detailed assessment of the proposed refinery, which is to be located in Lobito, Angola, and will have a capacity of 200,000 BPSD of refined product. Brendon was responsible for the review of the Sonaref Refinery ESHIA Report and also wrote the Non-Technical Summary for this project.

Natasha Ezekiel

Senior Social Performance Specialist

Natasha is a Senior Social Performance Specialist based in Nairobi (Kenya) and has been working for ERM for twelve years. Areas of expertise include Environmental and Social Due Diligence (ESDD), Environmental, Social and Health Impact Assessment (ESHIA), resettlement / land acquisition, stakeholder engagement, social investment, gender and vulnerability.



Natasha has worked in South Asia, Africa and Eastern Europe/Balkans and is very familiar with international standards, including the International Finance Corporation (IFC) Performance Standards, Equator Principles and European Bank of Reconstruction and Development (EBRD) environmental and social standards.

Outside of ERM, Natasha undertook research for her dissertation paper on 'Gendered Impacts of Displacement caused by Environmental Change in West Bengal' as well as prepared a research paper for Oxfam on Gender and Climate Change issues. She also spent three months in India conducting research on a number of Non-Governmental Organisations (NGO) for a fundraising company.

Experience: 12 years' experience in social performance and risk management.

LinkedIn: <https://www.linkedin.com/in/natasha-ezekiel-58508514/>

Email: Natasha.ezekiel@erm.com

Fields of Competence

- Social impact assessment
- Physical / economic displacement and resettlement action planning
- Stakeholder/community engagement
- International and community development
- Environmental and social due diligence
- Climate change (social impacts)

- Water, sanitation and hygiene promotion (WASH)
- Gender, livelihoods and poverty/vulnerability assessment
- Qualitative and quantitative research methods
- Project management

Education

- MSc Development Studies, Birkbeck College (University of London), (2009)
- BA Hons Film and Media with Sociology, University of Stirling (2003)

Languages

- English, Native Speaker

Key Industry Sectors

- Oil & Gas
- Agriculture / Natural Resources
- Renewables
- Power
- Mining
- Infrastructure
- International Development

ERM project experience includes:

- Land acquisition and compensation, and Corporate Social Responsibility (CSR) feasibility studies for a solar developer, Malawi;
- RAP for a solar development in Bauchi State, Nigeria;
- ESIA and Social Investment Project for the Trans-Adriatic Pipeline Project crossing Albania, Greece and Italy;

Key Projects

- **Land Acquisition and Corporate Social Responsibility Specialist for a Solar Project, Malawi, 2017 to date.** Natasha is the land acquisition and CSR specialist for the project providing advice and support in relation to compensation, livelihood restoration and stakeholder engagement, in line with the IFC requirements.
- **European Investment Bank, Indigenous Peoples Compliance Assessment for a Wind Farm Project, Kenya, 2017.** Review of the engagement and land acquisition process against international and national requirements in relation to indigenous peoples, and corrective action plan.
- **Maralal / Enel, Resettlement and Livelihood Restoration Framework (RLRF) and ESIA for the Northern Wind Farm Project, Meru County, Kenya, 2017.** Development of the RLRF for this proposed wind farm project, to act as a basis for the development of a Resettlement Action Plan.

- Resettlement Review for the Trans-Anatolian Pipeline in Turkey;
- Indigenous Peoples Compliance Review for the Lake Turkana Wind Farm Project, Kenya;
- ESIA and land acquisition support for a planned airport expansion project in Tamale in Ghana; and
- Economic Compensation Audit for a Transmission Line Project in Ethiopia.

Key before joining ERM

- Gender and Climate Change Researcher for Oxfam UK
- Volunteer Researcher for NGOs in India
- **Guinea Aluminum Corporation, Gender Strategy, 2017.** Development of a Gender strategy for GAC, which consolidates gender aspects of their environmental and social management system and includes specific internal and external goals and key performance indicators to monitor gender impacts.
- **CONCO Economic Compensation Audit for Transmission Lines in Addis Ababa, Ethiopia, 2017.** Review of the land acquisition and compensation process undertaken for three transmission lines in Addis Ababa against the IFC Performance Standards.
- **Confidential Client. Environmental and Social Due Diligence against the IFC Performance Standards on a Jatropha Plantation project in Ghana, 2017.** Social specialist for this assignment including a review of land acquisition and resettlement, stakeholder engagement, community investment, health and safety, and labour and working conditions.
- **Confidential Client. Environmental and Social Due Diligence against the IFC Performance Standards on a Tropical Fruit Production and Processing Facility, Ghana, 2016.** Social

specialist for this assignment including a review of land acquisition and resettlement and labour and working conditions.

- **EleQtra, ESIA for a Wind Farm Development, Ghana, 2017:** Social lead for this potential wind farm development across a number of districts in the South of Ghana, comprising up to 25 utility scale wind turbines each of up to 3.6 MW capacity.
- **Emerging Markets Power, Osudoku Wind Farm ESIA, Ghana, 2016-date:** Social lead for a potential wind farm development in the Shai-Osudoku district of Ghana, comprising up to 35 turbines over 2,000 acres of land and a 9km transmission line route.
- **Confidential Client. Environmental and Social Review of a Rubber Plantation and Associated Mini-Hydro Project, Liberia, 2013.** Review of secondary data and site tour the rubber plantation and planned mini-hydro project to power associated facilities in Liberia against the IFC Performance Standards, on behalf of an investment bank. The assignment involved meetings with various stakeholders and an assessment of health and safety performance, worker accommodation, environmental and biodiversity issues, and engagement.
- **Confidential Client (Investment Bank). 'ERM's Support of Environmental and Social Review Activities' – Framework Contract, 2010-2013.** Project Manager and Social Specialist for this framework contract with an investment bank. The main objective of this contract is to conduct environmental and social reviews against the IFC Performance Standards in order for funding to be provided. Assignments are focused in a variety of sectors including agriculture/forestry, oil & gas and metals across Latin America, Asia, Africa and Eastern Europe.
- **Millennium Challenge Corporation, Mount Coffee Hydro Rehabilitation Project, Resettlement Review and Water, Sanitation & Hygiene (WASH), Gender and Livelihoods Program, Millennium Challenge Cooperation and Government of Liberia, 2015-date.** Provision of environmental and social technical advisory services for the Mount Coffee Hydropower Rehabilitation project, including a review of the RAP process and analysis of livelihoods interventions resulting from land acquisition. The project also includes development of a WASH programme to support project affected communities.
- **Bumbuna Phase II Extension and Yiben Dam Hydro Electric Power Project, Joule Africa, Sierra Leone, 2013-2016.** Social Specialist for the development of the HEP development in Sierra Leone, undertaken to international standards including IFC Performance Standards, African Development Bank and European Investment Bank.
- **IFC Fragile and Conflict States/Conflict Affected Countries (FCS/CASA) Gender Baseline, Impact Assessment and Gender Mainstreaming Implementation Plan, 2016.** Gender analysis of projects across 9 African countries, including in-country consultation with key stakeholders and beneficiaries in Sierra Leone and Liberia, to assess gender impacts and to develop a gender mainstreaming implementation plan for future initiatives.
- **Trans-Anatolian Pipeline Project (TANAP), Resettlement Action Plan (RAP) Review Audit, 2016.** Project manager for RAP resettlement review audit of a planned gas pipeline across the northern region of Turkey.
- **Rio Sava, ESIA for the Jadar Mine Development, Serbia, 2016-ongoing.** Social lead for the Jadar large scale mine ESIA, including social baseline assessment and stakeholder engagement.
- **Bauchi Solar Resettlement Action Plan Project, Nigeria, 2015-date.** Project Manager and RAP

specialist for a RAP upgrade project located in Bauchi State, in line with the African Development Bank and IFC requirements. The project involves resettlement of communities in a planned 200 hectare plot and 18 km transmission line.

- **Trans-Adriatic Pipeline, Social Investment Strategy, Albania and Greece, 2015-date.** Project Manager and social specialist supporting in-country teams on the development and implementation of a social investment strategy along the 550 km gas transmission pipeline in Greece and 215 km in Albania.
- **Timok ESIA for a copper mine development, Serbia, 2015-date.** Leading the social baseline survey and stakeholder engagement planning for this project located in eastern Serbia, which is currently still in the exploration phase.
- **Petromanas ESHIA for Oil and Gas Exploration in Albania, 2015.** Social specialist responsible for stakeholder engagement and baseline data gathering for this exploration project covering three regions in rural Albania.
- **Dangote, Environmental and Social Management Plans, Nigeria, 2014.** Social specialist for the development of management plans covering stakeholder engagement, land acquisition and resettlement and community investment for a large African conglomerate which produces cement, sugar and rice.
- **Confidential Client. Rapid Environmental and Social Screening Study for an Oil and Gas Project in Europe, 2014.** Social specialist responsible for preparing a high level desk based screening study to identify potential project risks to facilitate a decision on the future of the oil and gas development.
- **Marampa Mine Resettlement Action Plan (RAP). Sierra Leone, 2013-2014.** In-country team lead and technical expert for this IFC compliant RAP, which includes over 10 potentially affected communities. Activities involve managing a field team of about 40 consultants (national and international), field planning/logistics, training, development of data gathering and consultation tools, stakeholder engagement, baseline data collection and identification of host sites.
- **Marampa Mine ESIA Project (Marampa 9/5). Sierra Leone, 2012-2013.** Management of an extensive stakeholder engagement programme and social baseline activities for a mining project in Sierra Leone, involving preparation of stakeholder engagement plan, training and coordination of national consultants, development of data collection tools (household survey, focus groups and key informant interviews) and assessment of social and health impacts, including an assessment of potential economic displacement and livelihoods / subsistence farming.
- **Non-Technical Assessment of Onshore Site Alternatives for a Confidential Gas Project, Tanzania, 2013.** Social specialist for the site selection and reporting, including assessment of potential impacts for each option, for a gas project in Tanzania.
- **Trans-Adriatic Pipeline (TAP) ESIA's. Greece & Albania, 2011-2012.** ESIA disclosure/stakeholder engagement activities and field survey for this gas pipeline project crossing Italy, Albania and Greece. Activities included managing a team of national consultants, commune and settlement meetings, focus groups and interviews with key informants. The project included an assessment of agricultural activities along the project footprint including cultivation of vegetables and high value fruit trees. The project was prepared in compliance with the EBRD standards.
- **Confidential Client. Power Plant ESIA and RAP Project, Nigeria, 2011.** Developed field survey tools as part of the social baseline data collection and the RAP for this Power Plant project in Nigeria.

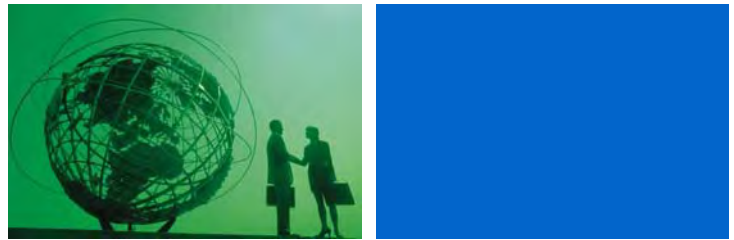
- **Confidential Client. Mining Project, Guinea, 2011.** Explored the internal and external impacts of work camps on the community and within the potential camps. Gender was one of the key areas being explored due to the sensitive nature of the sites being close to local communities and ethnic diversity within the camps.
 - **Confidential Client. Oil Facility Expansion Resettlement and ESHIA in Kazakhstan, 2010-date.** Involved in the preparation of the Resettlement Policy Framework. Also involved in baseline data activities and scoping in preparation for the Impact Assessment.
 - **Teck Community Resettlement Guidance. 2010.** Assisted with the development of resettlement guidelines and tools for this mining company which involved providing advice on how resettlement should be managed in accordance with IFC and World Bank standards.
 - **EGMK. Environmental and Social Aspects of a Pre-Feasibility Study for the Elkon Uranium Mining Project, 2010.** Conducted a review of International Standards relevant to the mining industry and prepared a guideline related to the potential social impacts for the client prior to the ESIA stage of the project.
 - **BP Egypt. ESHIA for an Offshore Gas Pipeline in Egypt, 2010.** Assisted in the preparation of the health and social impact baseline report for this project which involved collating and analysing secondary data.
 - **Confidential Client. ESIA of a Gas Storage Project, 2009.** Conducted research on environmental receptors (human, biological and cultural) for an EIA report against international standards.
 - **European Commission/DG Environment. Support for preparation of water related investment projects under the DABLAS Task Force, Bosnia and Herzegovina, Serbia, FYROM (Macedonia), Montenegro, Bulgaria, Croatia, Romania and Turkey 2007-2011.** The main objective of this Project was to prepare projects related to the protection of water and water related ecosystems in the Danube and Black Sea. Project Manager and stakeholder liaison responsible for financial management, attending stakeholder meetings in Bosnia, Macedonia and Montenegro and preparing progress reports.
 - **Department for Food and Agriculture (London), Management of the Second Phase of the Indo-UK Collaborative Research Programme on the Impacts of Climate Change in India, 2008-2010.** Project Coordinator for this project involving an assessment of vulnerability and adaptation relating to the impacts of climate variability and change in two Indian states (Orissa and Madhya Pradesh).
 - **Clark Sustainable Resource Developments Ltd. (CSRD) Environmental and Social Impact Assessment of Harvesting Trees in the Volta Lake in Ghana, 2008.** Responsible for the coordination and management of subcontractors as well as tracking the budget, liaising with the client, finalising deliverables, organising logistics such as meetings and travel, and ensuring that health and safety standards were adhered to at all times.
- Relevant Non ERM Experience
- **Birkbeck College (University of London), Dissertation Research: ‘Gendered Impacts of Displacement Caused by Environmental Change in West Bengal, India.’ 2009.** The paper focused on the impacts that displacement caused by environmental / climate change, such as sea level rise, drought and extreme weather events including flooding and cyclones, has on the livelihoods of men and women already living below the poverty line.
 - **Oxfam, UK. Gender and Climate Change Researcher, 2008.** Volunteer for Oxfam’s Climate

Change Team to collate data to demonstrate the linkages between gender and the impacts of climate change for a policy paper. The data was organised using the Sustainable Livelihoods Approach which covers social, natural, physical, natural, financial and human capital.

- **Kindemotherlife – Children Need Health (KNH) and Peace Child India, Researcher, 2004.** Field research in exploring the work of KNH and Peace Child India based in rural Tamil Nadu and the outskirts of Bangalore. The research involved interviewing senior members of the organisations, teachers, care / social workers and alike as well as street children, working children, women in self-help groups and men to understand the projects managed by the charities. The projects included income generation, teaching children practical skills such as IT and tailoring and managing orphanages.

Andrew Edward Cauldwell

Principal Consultant



Andrew Cauldwell is based in Johannesburg from where he serves as ERM's Biodiversity Technical lead for the Europe, Middle East & Africa Region. Andrew is qualified with a Master's Degree in Wildlife Management, is a registered ecologist with the South African Council for Natural Scientific Professions and has over 25 years of professional experience in environmental consulting and hands on protected area management. This includes approximately nine years of experience in East Africa (primarily Tanzania and Ethiopia).

Andrew has been involved in numerous ecological interventions for Power (Hydropower, Solar, Wind and Transmission developments), Oil & Gas, Mining, Infrastructural, Agriculture & Forestry and the Conservation/Protected area sectors in most African countries. Andrew has a depth of knowledge of a wide variety of African habitats (including many critical habitats), species and ecology and the impacts of human activities on these habitats. This has been gained through a multitude of due diligence studies, Baseline, Critical Habitat Assessments, Ecosystem Services, Impact Assessments, Mitigation, Management and development of practical biodiversity management/action plans. Andrew has provided a key interaction with clients, marketing and proposal development, team leadership, mentoring and implementation of best practice, project review and Quality Control.

Andrew has a depth of understanding of the IFC performance standards (particularly PS6) following direct interaction with IFC, also various certification standards (FSC, RSPO and SAN). He has extensive experience in applying the standards to projects over a wide range of conditions. Andrew keeps a broad network of biodiversity, social and influx specialist consultants in at least 19 African countries and beyond. He also participates in the South African Mining and Biodiversity Forum (SAMBF), which has a regional influence. His work has been acknowledged by the IFC, World Bank, IUCN and South African authorities.

Fields of Competence

- Specialist components of ESIA's and Action plans to International Finance Corporation (IFC), ICMM and various company standards including:
 - Ecological Risk Assessment
 - HCV / Critical habitat assessment
 - Threatened species studies
 - Ecosystem services assessments
- Protected area management

Professional Affiliations & Registrations

- Pr.Sci.Nat. Ecology (membership: 400213/09)
- South African Wildlife Management Association
- Grassland Society of Southern Africa
- Birdlife South Africa

Education

- MSc (Wildlife Management), University of Pretoria, South Africa, 1998
- BSc Hons (Wildlife Management) University of Pretoria, South Africa, 1994
- BSc (Agric.), University of Natal, South Africa, 1987

Languages

- English
- Afrikaans
- KiSwahili

Key Industry Sectors

- Infrastructure
- Power
- Oil and Gas
- Mining
- Food and Agriculture

Key Publications

Caro, T.M., Young, C.R., Cauldwell, A.E. & Brown, D.D.E. 2009. Animal breeding systems and big game hunting: Models and application. *Biological Conservation* 142 (4).

Baldus, R.D., & Cauldwell, A.E. 2005. Tourist hunting and its role in development of wildlife management areas in Tanzania. *Proceedings of the 6th International Game Ranching Symposium July 6-9, 2004*. International Foundation for the Conservation of Wildlife, Paris

Zieger, U. & Cauldwell, A.E. 1998. *Wildlife Ecology & Management, practical aspects for Zambian game ranches*. Self-published (ISBN: 0-620-22924-1)

Selected Projects of Relevance as a Biodiversity Consultant

1. Projects in Tanzania

Develop a SEA to support the Rufiji Basin IWRMDP, Tanzania, Sept 2016. Role: Biodiversity Technical Lead

A Strategic Environmental Assessment (SEA) was compiled to assess potential impacts and guide implementation of the Rufiji Basin Integrated Water Resource Management and Development Plan (IWRMDP). The plan and the SEA were funded by DfID (UK Foreign Aid) and provided a comprehensive approach to all issues associated with water in the basin, with emphasis on critical water shortages and the impacts of several hydropower schemes. The ecological components integrated with physical and social aspects. These considered measures of the plan with potentially large impacts to protected areas (world heritage sites, national parks, game reserves, Ramsar sites, important bird areas, deltas and marine protected areas. Management of catchments and wetlands were key sustainability requirements. A number of lesser ecological aspects were also assessed.

ESIA upgrade for a 220 KVA transmission line in Tanzania. Oct 2016 to Feb 2017. Biodiversity Technical Lead

A existing ESIA for construction of a 144 km transmission line from Geita to Nyakanazi, Tanzania was upgraded to meet international KfW (German Development Bank) standards. Field studies were conducted by local subcontractors who were guided on the necessary procedures and reporting to meet the required standard. ERM compiled the impact assessments.

Ongoing Support and Reforestation Action Plan (RAP) for an Agricultural Tea Estate in southern Tanzania, October 2014. Role: Project Manager and Technical Lead

A confidential RAP was compiled for a large agricultural estate to facilitate recertification following loss of forest from clearing. The RAP included a site assessment, mandatory and recommended actions, a timeframe and monitoring measures.

2. Projects in East Africa (incl. Ethiopia)

ESIA for a long distance Express Motorway in Kenya. Nov 2017 and ongoing. Role: Biodiversity Technical Lead

A US-based Engineering client proposed to develop a high speed express motorway between Nairobi and Mombasa (~473km), resulting in a 60% reduction in the transit time between Nairobi and Mombasa, support economic growth, and is considered one of the most important infrastructure projects currently proposed in East Africa. Key biodiversity issues for the ESIA include

unprecedented impacts to large wildlife caused by the road passing through the Tsavo East and West National Park. ERM will be partnering with a reputable conservation organisation to model wildlife dispersal patterns and identify optimum locations and designs for crossings over the express motorway.

Review of an ESIA for an Oil & gas development on the shores of Lake Albert, Uganda. May 2016. Biodiversity Reviewer

Due Diligence review to IFC Environmental Health and Safety (EHS) Performance Standards (2012) for a comprehensive ESIA developed by Golder Associates for an Oil & Gas development on the shores of Lake Albert Uganda. The ESIA had identified sensitive biodiversity and several critical habitat triggers.

ESIA development for a Seismic Survey in the central Ethiopian Rift Valley, Ethiopia, July 2013. Biodiversity Technical Lead

An ESIA was developed for a proposed seismic survey for oil exploration in a 45,000 km² block within the Rift Valley. The area includes eight large lakes, several protected areas, extensive natural and cultivated habitats. Extensive consultation was held with national, regional and district (Woreda) authorities as field survey and community consultation to assess ecological sensitivity and ecosystem services. The study includes and Impact Assessment and major inputs into an EMP.

3. Projects Elsewhere in Africa

ESIA for hydropower development on the Kalungwishi River, Zambia, Mar 2017 - ongoing. Role: Biodiversity Technical Lead

Two hydropower schemes being developed on the Kalungwishi River, north-eastern Zambia. Andrew conducted a Biodiversity Red Flags assessment for unique frogs and vegetation in the spray zones, has supervised detailed terrestrial, aquatic and environmental flow assessments and has served as the biodiversity lead for the ESIA projects involving the two power generation assets, transmission lines and assessment of the adjacent Lusenga Plains National Park as a potential offset to compensate for the biodiversity losses.

Landscape Alternatives Analysis for the Sounda Dam Hydropower Scheme, Republic of Congo, Oct 2016 to Mar 2017. Role: Biodiversity Lead and Project Manager

The IFC have appointed ERM to assess alternative options for hydropower generation within the Kouilou-Niari River Basin in the Republic of Congo. The Sounda Dam has been proposed as a large hydropower generating facility but potentially has large impacts to biodiversity (various great apes) and indigenous people (pygmy people). ERM has appointed engineers to

identify alternative hydropower options within the basin, and is leading a global environmental specialist team to assess the impacts of alternative options and compare to the impacts associated with the Sounda Dam.

Risk Assessment for a Hydropower Development, Finance Client, 2017. Role: Biodiversity Technical lead and field assessment

ERM conducted a biodiversity risk assessment for a hydropower plant proposed within rainforests of the Mont du Cristal National Park, Gabon. A critical habitat assessment was conducted in collaboration with Fauna Flora International, followed by a site visit to ground truth results, which led to the recommendation that alternative locations should be investigated.

ESIA for the Batoka Gorge Hydropower Scheme for the Zambezi River Authority. November 2014 and ongoing. Role: Biodiversity Technical Lead

A comprehensive ESIA has been developed for the above hydropower scheme for the Zambezi River Authority (ZRA). The ESIA builds on baseline data collected for older ESIA for earlier projects of the same scheme. Biodiversity components consist of vegetation, habitat assessments, fauna, birds (with a focus on Taita Falcons) and detailed environmental flow assessments compiled together with Black Crystal consultants, Zimbabwe Falcon Club and Southern Waters. Andrew has also been involved in training counterpart as part of the ESIA deliverable.

Biodiversity Management Plan (BMP), Kabompo Hydropower - Copperbelt Energy Corporation, Zambia, Feb 2015. Role: Project Mgmt and Biodiversity Technical Lead

A BMP was compiled for the Kabompo Gorge Hydroelectric Project in northern Zambia. Various Environmental Impact Statements (EIS) reports were independently compiled for each of the project components and a BMP was requested by international lenders to demonstrate how the project will comply with the IFC standards with emphasis on Performance Standard 6. ERM's studies for the BMP included site assessments, stakeholder engagement, comprehensive management measures and a review of the feasibility of implementing an offset to compensate for residual biodiversity impacts.

Supplementary Package for the Atuabo Free Port ESIA, Western Ghana. Jan to Oct 2016, Role: Biodiversity Technical Lead

ERM were commissioned to address significant gaps in the biological, social and physical risks that were identified through a lender's due diligence review of the Atuabo Free Port 2014 ESIA based on the IFC Environmental Health and Safety (EHS) Performance Standards (2012). The biodiversity components that Andrew addressed involved strong collaboration with the IFC Biodiversity team, analysis of critical habitat for

shorebirds, wetlands, vultures and sea turtles, demonstrating Net Gain and No Net Loss through an innovative quantitative loss/gain comparison and offsetting feasibility that integrated biodiversity and social mitigation.

Mulungushi Hydropower Project. Kabwe, Zambia. 2013. Role: Biodiversity Technical lead

ESIA for upgrading of an old hydropower development through rerouting of additional water and development of underground power generating facilities. Biodiversity studies involved assessment of terrestrial ecology and detailed environmental flow assessments.

Reconstruction Bird Study for an Onshore Oil & Gas Plant, Ghana West Coast. Nov 2015 to Jan 2016. Biodiversity Lead

An ornithological study of the Amansuri Wetland Important Bird Area was conducted for eni prior to construction, and to support development of a management plan. The study had a specific focus on the shorebirds, hooded vultures and forest birds.

ESIA for a Solar Farm to provide onsite power generation for the Goldfields South Deep Mine. Feb to Aug 2017. Role Biodiversity Lead.

The South Deep Gold Mine were allocated rights for development of a large solar farm to augment their power demands. ERM assisted the site selection process through a careful analysis of alternatives, and compiled an ESIA for the development. The site selection included wetland studies, and assessment of impacts to natural grassland supporting sensitive species and mitigation has been developed relating to a set aside and advice on developing an offset to meet the IFC Performance Standard requirements, which has culminated in submission of an offset proposal.

Biodiversity Coordination and Wetland Assessment for the Afungi Peninsular, Mozambique. 2011 to 2013, Wetland Assessor and Biodiversity Technical Lead

ERM contracted Natural Scientific Services to conduct a comprehensive wetland delineation assessment and aquatic ecological studies in support of a comprehensive ESIA project. Tasks involved delineation of large wetlands and assessment based on a variety of methodologies including South African wetland guidelines and international best practice, and aquatic assessments using SASS5, MIRAI and FRAI assessment techniques. Andrew later joined ERM and was involved in a biodiversity coordination role for the conclusion of the project as a whole.

Due Diligence Study of the Wildlife Management by the Due Diligence Study of the Wildlife Management by the Kumba Iron Ore Mine (Anglo American owned), Thabazimbi, South Africa. July to Oct 2015.

The Thabazimbi Mine owns extensive land that incorporates the Ben Alberts Nature Reserve. Their

closure plan states that the end land use is dedicated to wildlife production. An assessment of their wildlife management capacity and current state of the property.

Biodiversity Inputs for the GAC Mining Operation, Guinea

ERM compiled a comprehensive ESIA with impact assessment and management plans for the aluminium mining operation in Central Guinea. Sensitive biodiversity components included impacts to chimpanzee habitat and range-restricted reptiles. Biodiversity work was conducted in collaboration with the Max Planck-supported Wild Chimpanzee Foundation (WCF). Andrew visited the site in July 2014 to assist with the early categorisation of biodiversity issues and screening from a biodiversity perspective, and provided inputs into the terrestrial aspects of the Biodiversity Monitoring and Evaluation Plan developed by ERM for this site.

ESIA for a Zinc Mine, Northern Cape, South Africa Feb 2013 Biodiversity Technical Lead

Development of a comprehensive ESIA to Vedanta standards (based on IFC standards) for the Gamsberg Zinc Mine in a sensitive and irreplaceable inselberg habitat. Includes comprehensive impact assessment and offset strategy. Duties have involved technical leadership for high profile subcontractors, impact assessment and consolidation of biodiversity components of the ESIA.

Biodiversity Monitoring Review for Vedanta Zinc International, South Africa. Feb 2017, Role: Technical and Project Lead

Vedanta Zinc International are in the construction phase for a new mine in the arid Northern Cape region of South Africa, in an area known to be a biodiversity hotspot with high levels of endemism. The mine maintains a nursery to save a diversity of small and unique succulent plant species and a large offset is being implemented to compensate for adverse impacts. VZI have partnered with IUCN to guide their biodiversity management. A review of their capacity to implement monitoring programmes was conducted at the request of IUCN.

Strategic Environmental Assessment for the New Town development for TFM in southern DRC. 2014. Role: Biodiversity Technical Lead

ERM developed an SEA for the proposed New Town development in the south of the TFM concession. This area supported old growth miombo woodland and various levels of cultivation. Conservation of the remaining biodiversity was included into the SEA.

4. OTHER PROJECTS

Evaluation of a World Bank/GEF funded project to the Department of Wildlife and National Parks (DWNP), Botswana. 2015 Ongoing. Role: Sole consultant

The DWNP were finalising the 6-year Northern Botswana Human Wildlife Coexistence Project established to mitigate the severe Human-Wildlife Conflict issues there. These efforts focussed on crop-raiding by elephants and livestock predation by lions. Mitigation involved use of chilli pepper deterrents, introducing early maturing maize, predator proof kraals, and training local youth to enter the wildlife tourism economy. There was an emphasis on inclusion of indigenous people (Kalahari San). Andrew is involved to compile a Final Evaluation Report for the DWNP to submit to the World Bank/GEF.

Biodiversity Action Plan Review and Revision, MMG Kinsevere Mine, Katanga, DRC, Oct 2013. Role: Project Mgmt and Biodiversity Technical Lead

Biodiversity Technical Lead for review and updating of the existing BAP for the Kinsevere Copper Mine. Use of the MMG BAP template was pioneered following consultation with mine and community stakeholders. Emphasis of the BAP was placed on reconstruction of critical habitat for copper-tolerant plant species, and community involvement is averting loss of biodiversity over the greater area.

Critical Habitat Assessment and Preconstruction Bird Study for an Onshore Oil & Gas Plant, Ghana West Coast. Nov 2015 to Jan 2016. Biodiversity Lead

ERM was commissioned to compile an ESIA for eni to develop an onshore oil & gas facility in western Ghana. Andrew has been involved in the latter stages conducted a preconstruction ornithological study of the Amanzuli Wetland Important Bird Area was involved in compiling a critical habitat assessment and review of biodiversity action plans compiled by Fauna Flora International.

Compiling Biodiversity, Wetland and Dredging Management Plans for the ENI East Africa in northern Mozambique. Nov 2016 to March 2017. Onshore Biodiversity Lead

ERM was commissioned to compile Wetland and Biodiversity Management Plans (including marine biology) to international standards for the proposed ENI oil & gas facility on the within the same Afungi peninsular site provided for Anadarko in northern Mozambique. An ESIA was compiled by ERM in collaboration with Impacto. Further baseline studies have been compiled for the greater area by CH2M, and contributed to the management plans.

Overview of Andrew Cauldwell's experience in Wildlife and Protected Area Management:

The following bulleted points provide an overview of Andrew's experience over 20 years in biodiversity conservation-related issues and extensive experience in protected area management:

Qualification

- Andrew holds Master's Degree from the University of Pretoria in Wildlife Management based on a thesis (completed in 1998) on the development of a comprehensive Wildlife Management Plan for a private game ranch in central Zambia. During this time he authored a book on Wildlife Ecology & Management, practical aspects for Zambian game ranches (*see Key publications*).

Wildlife and Protected Area Experience

- Andrew conducted a final evaluation for the World Bank for the Northern Botswana Human Wildlife Coexistence Project, described above.
- Andrew implemented an EDF project (European Development Fund) with the Wildlife Division (Ministry of Natural Resources & Tourism), Tanzania from 1999 to 2006 (7 years) rehabilitating seven vast game reserves in north-western Tanzania (these included Moyowosi, Kigosi, Burigi, Biharamulo, Kimisi, Ibanda and Rumanyika Game Reserves). Andrew was the Technical Advisor to the Kagera Kigoma Game Reserves Rehabilitation Project (KKGRRP) to that project, and has extensive experience in the management of donor funded projects. This was a complex project established to boost the management and protect these reserves, demarcate and develop infrastructure, develop

community wildlife programmes and compile management plans. Andrew has extensive hand-on experience in practical aspects of protected area management and biodiversity conservation after many years in a leadership role with the KKGRRP.

- In Tanzania, Andrew collaborated closely with the Selous Conservation Programme (SCP) implemented by GTZ (now GIZ) and was extensively involved in the Selous Game Reserve. Both the KKGRRP and the SCP pioneered the development of community wildlife management areas and community-based conservation programmes. These activities were highly successful and led to significant return of wildlife populations to community-managed areas outside of the game reserve boundaries.
- Andrew worked for WWF-SA in 1994 managing the Skilpad Wildflower Reserve in Namaqualand, which has since become a part of the greater Namaqualand national Park.
- Andrew has managed the Jwala Game Reserve in the northern Tuli Block in eastern Botswana (1991 to 1993) located between the Shashe and Limpopo Rivers, and he has been directly exposed to many of the management issues of the area.

Curriculum Vitae (CV)

1. **Name of Staff:** Kent Kafatia
2. **Proposed Position:** Team Leader (Water and sanitation expert)
3. **Name of Firm:** Water Waste & Environment Consultant
4. **Date of Birth:** 5th September 1950
5. **Nationality:** Malawian

6. Education:

Institution	Loughborough University of Technology, England
Year of obtaining	1987
Degree/Diploma obtained	MSc in Water and Waste Engineering

Institution	Syracuse University, New York
Year of obtaining	1978
Degree/Diploma obtained	BSc in Chemical Engineering (Environmental)

Institution	SUNY, College of Environmental Science & Forestry, New York
Date	1977
Degrees obtained	BSc in Forestry (Pulp and Paper Engineering)

Institution	VKI, Denmark
Date	1998
Degrees obtained	Post Graduate Diploma in Water and Environment Management

Institution	University of the North, RSA
Date	2000
Degrees obtained	Advanced Certificate in Water & Environment Management

7. Other Training:

- Management Skills Training Courses 1, 2 and 3 (BPSMS, Zimbabwe, 1991)
- Team Management Course (Zimbabwe, 1992)
- Safety and Loss Control Courses 1 and 2 (Zimbabwe, 1993)
- Utility and Energy Conservation Course (Kansas, USA, 1994)
- Development and Utilization of Biomass Energy Resources in Developing Countries (Vienna, Austria, 1995)
- Waste Water Treatment using Natural Sorbents (Plesen, Czech Republic, 1996)
- Environmental Impact Assessment Course, (Malawi Institute of Management, 1995)
- Development and Utilization of Medicinal and aromatic plants (Anadolu University, Turkey, 1996)
- Rural Energy Project Planning and Environmental Management (Maseru, Lesotho, 1997)

8. Membership in Professional Associations:

- Registered Engineer, 1987, Malawi Board of Engineers.
- Chairman of the National Technical Committee on Environmental for Malawi, 1994 to date.

- Have been a member of several professional organizations (American Institute of Chemical Engineers, American Society of Mechanical Engineers, American Accredited Safety Auditors, and the Institute of Environmental Managers, UK).

9. Countries of Work Experience:

Malawi, Mozambique, Zimbabwe, Zambia, Botswana, South Africa, Germany, USA

10. Languages:

Language	Speaking	Reading	Writing
English	Excellent	Excellent	Excellent
Chichewa	Excellent	Excellent	Excellent
Tumbuka	Basic	Basic	Basic
French	Basic	Basic	Basic

11. Employment Record:

Period	Employer	Positions held
2005 - Date	Water, Waste and Environment Consultants	Lead Consultant and Managing Director
1998 - 2004	Central Region Water Board	Operations Manager
1989 - 1994	Oil Company of Malawi	Engineering Manager
1987 - 1989	Ethanol Company	Special Projects Engineer
1981 - 1987	Blantyre City Council	Pollution Control Engineer

12. Work that best illustrates experience related to the assignment

Name of assignment or project	Preparation of the Strategic Sanitation Plan for Lilongwe and Blantyre City Low Income Areas
Year	2013-2014
Location	Lilongwe and Blantyre, Malawi
Client	Ministry of Irrigation and Water Development
Main project features	The Strategic Sanitation Plan, for the period of 2013 to 2022, was the fourth and the last output of the sanitation planning for Lilongwe and Blantyre City Low Income Areas The Plan presented the sanitation situation analysis; technology review and selection; sanitation coverage plan; institutional arrangements; and proposed the sanitation interventions' implementation plan for the project areas. In addition, the plan presented the preliminary design, drawings and costs for the recommended sanitation interventions.
Positions held:	Team Leader
Activities performed	<u>Conducting a Social Status study:</u> focussing on population, water supply, sanitation and hygiene facilities diagnostic status; assessment of hygiene behaviour, available water and sanitation facilities and problems; and

opportunities for improvement. The study also included assessment of tools and equipment for toilet sludge emptying transportation and handling.

Conducting a Baseline Assessment for institutional review (financial, technical, legal etc.), to clarify roles and the responsibilities in delivery of water, sanitation and hygiene; marketing analysis for water and sanitation demand and supply; current practices in waste management and disposal; existing frameworks on capacity building, governance and institutional strengthening and monitoring and evaluation; and current levels of involvement of the private sector.

Carrying out an Environmental and Social Impact Screening for the range of proposed sanitation interventions for the areas as well as developing Environmental Management Plans in accordance with the Environmental and Social Management Framework, Resettlement Policy Framework, World Bank Guidelines and Environmental Policy as well as the National Environmental Action Plan and Guidelines and Procedures of the government of Malawi.

Incorporation of crosscutting Issues in development of the sanitation plan: This included analysis and making recommendations on the impact of the project on women, children, elderly, and disabled and other vulnerable groups. It involved but was not limited to participation and decision making roles of women in water and sanitation, costs and benefits to these groups from the proposed improvements in water and sanitation and measures to enhance benefits and reduce costs on these groups.

Coming up with cost Estimates included identifying the overall sanitation requirements for priority interventions costing \$5, \$10 and \$25 per capital costs for preliminary and detailed design, construction supervision and for additional environmental and social impact assessment; costs for implementing recommended mitigating measures, mid-term review and end-of-project evaluation

Technical Ranking and Selection of Alternatives included review of the designs and specifications of the standard pit latrine and septic tank basing on the results of baseline and demand assessment; development of a selection criteria to which alternatives conform; narrowing down the list of priority interventions development of alternative sanitation options and proposing strategies to scale up improved sanitation and hygiene practices;

Making recommendations included a mix of interventions that best match the community's priorities given the \$5, \$10 and \$25 per capita ceilings; financial and economic viability of implementing the sanitation plan; appropriate institutional and financial arrangements to facilitate implementation of the Sanitation and Hygiene Plan and appropriate financing and investment strategy.

Name of assignment project	of or	Preparation of Environmental and Social Impact Assessment and Resettlement Action Plan for Water Supply Scheme for Lilongwe City
Year		2012
Location		Lilongwe
Client		Lilongwe Water Board

Main project features	The objective of the project was: (i) to undertake detailed feasibility studies of different water sources to supply Lilongwe until 2035, and (ii) to prepare the preliminary design of the required facilities, as well as a full environmental and social impact assessment. All along the studies, multi-purpose uses of the new water sources were considered, in compliance with the national policy. The identified dam sites studied for development of a new water source included: Diamphwe upper, Diamphwe lower / Linthipe, Lilongwe 3, Likuni, Lumbadzi and Ntofu
Positions held:	Team Leader
Activities performed	The consultant carried out environmental scoping to select the most environmentally acceptable water source and water supply option; prepared the Environmental and Social Impact Assessment Report and Resettlement Action Plan for the selected option through field investigations, public consultations and interviews of key stakeholder institutions. Preparation of the report involved review of relevant literature and legislation which governs preparation of ESIA's in Malawi, as well the World Bank Policies. Environmental and social impacts were predicted and assessed and Environmental Management and Monitoring Plans prepared.

Name of assignment project	Environmental Impact Assessment and Resettlement Action Plan for new Water Supply Scheme for Blantyre City
Year	2011 - 2012
Location	Blantyre, Malawi
Client	Blantyre Water Board
Main project features	Several potential options for new water supply for the City of Blantyre (Mombezi, Namadzi, Magomero, Lirangwe, Domasi Upper, Domasi Lower, Nansadi, Nswadzi, Lichenya, Matope, Walkers Ferry, Likhubula, Thuchila, Phalombe, Ruo, and Muloza Rivers) were investigated. The purpose was to select the most suitable and appropriate option; and to prepare detailed designs for the selected option.
Positions held:	Team Leader
Activities performed	Mr. K. Kafatia prepared a Preliminary Environmental and Social Evaluation to select the most environmentally friendly option and prepared an Environmental and Social Impact Assessment Report, including a Resettlement Action Plan for the selected most suitable option. The consultant carried out field investigations, public consultations and prepared the reports

Name of assignment project	Preparation of the Environmental and Social Impact Assessment for a New water intake on Mzimba River for water supply to Mzimba Town
Year	2011 - 2012
Location	Mzimba
Client	Northern Region Water Board
Main project features	intake to improve the water quality and availability to Mzimba town
Positions held:	Team Leader
Activities performed	The works involved preparation of an environmental and social impact assessment for the new water intake weir and transmission pipeline. In order to achieve this, the Consultant identified and detail the positive and negative effects of the proposed developments on the environment and

	human beings; and recommended appropriate mitigation measures for the identified impacts by preparing Environmental/Social Management Plan and Environmental/Social Monitoring Plan
Name of assignment project	Sanitation and Waste Scoping Study for Peri-Urban Sanitation and Hygiene Project in Mzuzu City
Year	2013-2014
Location	Mzuzu, Malawi
Client	Plan Malawi
Main project features	As part of the Peri-Urban Hygiene and Sanitation project in Mzuzu City, a Sanitation and Waste Scoping Study was required to investigate the availability of infrastructure for safe disposal of human excreta and household waste and to identify the knowledge gaps and constraints contributing to the shortfall of safe sanitation and waste management in Mzuzu City.
Positions held:	Team Leader
Activities performed	<p>Activities included:</p> <p>Mapping out existing toilets, urinals and their corresponding types along with their gender friendliness in 6 targeted areas of the City.</p> <ul style="list-style-type: none"> • Attached to the above, the study also came up with preferred forms of affordable technologies people liked to have if a chance to improve standards arose. • Assessing and documenting waste disposal sites in markets, their current status and also on how waste is managed (collection and disposal). • Establishing the types of waste and estimating the amounts including suggestions on frequency of collection of the waste and the possibility of people separating waste at household level before disposing it in the designated bins. Related to this the study also established the number of sites to be designated as waste collection points by service providers. • Investigating the people's attitude towards use of human waste as fertilizer for agricultural purposes and draw lessons from similar interventions that were implemented in the city to ensure improved implementation under this project. • Mapping out drains and establishing which ones are in state of disrepair and the main contributing factors to their current state. • Mapping out on-site sewerage systems existing in the slums including their current status and how these are supported by MCC or other service providers especially if the sludge overflows; and if collected establish the destination of the waste. • Assessing MCC's capacity in waste management service provision and identify gaps in the current system of service and make recommendations on how these can be addressed. • Conducting literature reviews about the current practices of waste management in MCC and establish if there are instruments for regulation of waste management and what gaps exist. • The study also critically focused on identifying constraints faced by the dwellers or landlords and MCC to improving sanitation and waste management in the city.

Name of assignment project or	Urban Water Supply and Sanitation Assessment Study
Year	2007
Location	Lilongwe and Blantyre, Malawi
Client	WaterAid
Main project features	The Urban Water and Sanitation Assessment (UWSA) was aimed at assisting Water Aid and its programmed promoters to gain a better understanding of the urban water and sanitation sector (UWSS) for improved programme and advocacy intervention in Malawi. The UWSA was aimed at sharing information and evidence on the state of UWSS with sector stakeholders, including communities. This would provide a basis for Water Aid and partners to engage and influence national, international and sector role-players for policy and practice change. The assessment facilitated identification of the strategic issues for Water Aid's programmed design and advocacy planning and implementation. The UWSA captured communities' perspectives as a basis for re-thinking existing perceptions and assumptions drawing lessons from Water Aid and partners' field experience and develop mechanisms for scaling up good practices and improving effective targeting of urban poor. Information derived from the assessment helped to influence effective targeting of sector investment to the urban poor areas. The UWSA enabled Water Aid to monitor and evaluate the short and medium-term impact of programmed and policy work in the urban sector and enable learning to feedback into the work.
Positions held:	Team Leader
Activities performed	<ul style="list-style-type: none"> • Gathering the existing baseline information for the National, City and Urban areas in the Water and Sanitation Services Sector. • Comparing information across the three dimensions of (1) sector governance at national level; (2) Lilongwe and Blantyre City service delivery levels, mechanisms, norms and practices; and (3) water supply and sanitation delivery and access for the urban poor. • assembling information on current levels of access to water and sanitation • Identifying barriers to that access to water and sanitation; • Assessing the role of service providers and; • Reviewing the legal, regulatory and financial environments that impact on the urban poor's access to water and sanitation services. • Compilation, analysis of data and report writing
Name of assignment project or	Preparation of the Resettlement Policy Framework (RPF) for the Shire River Basin Management Project
Year	2011 – 2012
Location	Shire River Basin in the Southern Malawi
Client	Ministry of Water Development & Irrigation
Main project features	The overall Program Development Objective was to make significant progress in achieving socially, environmentally and economically sustainable development in the Shire Basin. Project development objective of the Shire River Basin Management Program was to develop

	a strategic planning and development framework for the entire Shire River Basin (defined from outflow of the lake to the border at Nsanje) and support targeted investments to improve land and water resources management and livelihoods in the Basin
Positions held:	Team Leader
Activities performed	Preparation of the Resettlement Policy Framework for the Shire River Basin Management Project involved desk studies, field investigations, stakeholder and public consultations, environmental and social impact assessment and analysis, development of principles and objectives governing resettlement preparation and implementation, development of the process for preparation, review and approval of resettlement action plans; development of methodology and procedure for estimation of displacement and categories of affected persons; development of methods for valuing assets; narration of the relevant legal framework and eligibility for affected persons; design of grievance redress process and mechanisms and development of resettlement management and monitoring plans

Name of assignment or project	Preparation of the National Water Resources Investment Strategy
Year	2010
Location	National wide in Malawi
Client	Ministry of Water Development & Irrigation
Main project features	<p>The Government of Malawi (GoM) developed a National Water Resources Investment Strategy (WRIS) with the overall objective of <i>“identifying and prioritising investments in the water resources sector in view of the national development goals of economic growth and poverty reduction, sectoral development strategies and the constraining impact of underdevelopment of water resources on the country’s economic performance”</i></p> <p>The specific objectives of the WRIS project were:</p> <ul style="list-style-type: none"> (i) To analyse the economic development objectives of the country and how water resources affect the country’s achievements in economic growth and poverty reduction; (ii) To identify key water-related challenges for the country’s economic development in the medium and long-term; (iii) To set-up priorities for the water sector interventions in time and geographically; (iv) To identify priority water resources sector investments. <p>The project was aimed at contributing to the Poverty Reduction Goals and Targets defined in the Malawi Growth and Development Strategy (MGDS) for 2006-2011.</p>
Positions held:	Leading-Water Infrastructure expert
Activities performed	<ul style="list-style-type: none"> • Carried out investigations and inventorization of water infrastructure, including wastewater collection, transportation, and disposal infrastructure. • Assessed and analyzed water infrastructure for water demand utilization and projection.

Name of assignment or project	Preparation of Environmental Impact and Social Assessment and Resettlement Action Plan for Water Supply to Mzimba Town
Year	2010
Location	Mzimba, Malawi
Client	Northern Region Water Board
Main project features	The scheme, supplying water to Mzimba Boma was unable to meet the demand due to siltation of the intake, low water production capacities stemming from insufficient water sources, low capacity treatment plant as well as old and inadequate storage and distribution facilities. The main objective of the project was to improve the existing water supply system at Mzimba Boma; through construction of a dam, water transmission mains and distribution systems, to meet the demand of a growing population at the Boma and other peripheral areas; while maintaining high water quality.
Positions held:	Team Leader
Activities performed	<p>Mr. K. Kafatia carried out environmental scoping to and prepared the Environmental and Social Impact Assessment Report for the proposed dam, pipeline and distribution system through field investigations, socio-economic studies, public consultations and interviews of key stakeholder institutions. Preparation of the report also involved review of relevant literature and legislation which governs preparation of EIAs in Malawi, as well the World Bank Policies. Environmental and social impacts were predicted and assessed and Environmental Management and Monitoring Plans were prepared</p> <p>The Resettlement Action Plan, prepared as a separate report, was through field investigations and stakeholder consultation. The plan was to guide resettlement, compensation and livelihood restoration of the affected people displaced by construction of the dam.</p>

Name of assignment or project	Preparation of the Environmental and Social Impact Assessment for Water Supply to Mzuzu City
Year	2010
Location	Mzuzu City, Malawi
Client	Northern Region Water Board
Main project features	To improve the water supply services for Mzuzu City, the project comprised of construction of a dam on Lambilambi River; laying of a 28.5 km long water transmission pipeline from the dam to the water treatment plant; construction of treatment plant and pumping station at Lukalazi and laying distribution mains from the water treatment plant to the consumers. The total estimated cost of the project, is US\$48 million
Positions held:	Team Leader
Activities performed	The consultant carried out environmental scoping to select the most environmentally acceptable water source and water supply option; prepared the Environmental and Social Impact Assessment Report for the selected option through field investigations, public consultations and interviews of key stakeholder institutions. Preparation of the report also involved review of relevant literature and legislation which governs preparation of ESIA's in Malawi, as well the World Bank Policies. Environmental and social impacts were predicted and assessed and Environmental Management and Monitoring Plans were prepared

Name of assignment project	or	Preparation of Environmental and Social Management Framework (ESMF) for the National Water Development Programme II
Year		2007
Location		Lilongwe, Malawi
Client		Ministry of Water Development & Irrigation
Main project features		The Government of Malawi (Ministry of Water Development and Irrigation), with assistance from the World Bank, wanted an Environmental and Social Management Framework to be used as a guide for preparation of all environmental safeguards for the National Water Development Projects.
Positions held:		Team Leader
Activities performed		Desk studies; field investigations; stakeholder and public consultations; environmental and social impact identification, assessment and analysis; development of generic environmental management and monitoring plans and preparing the environmental and social management framework
Name of assignment project	or	Preparation of Environmental and Social Management Framework for multi-purpose Dams
Year		2007
Location		Lilongwe, Malawi
Client		Malawi Environmental Endowment Trust
Main project features		The Malawi Environmental Endowment Trust wanted an Environmental and Social Management framework to be used for screening of proposed small scale multipurpose (irrigation, fishing and water supply dam) projects.
Positions held:		Team Leader
Activities performed		Desk studies; field investigations; stakeholder and public consultations; environmental and social impact identification, assessment and analysis; development of generic environmental management and monitoring plans for each of the 5 corridors and preparing the environmental and social management framework
Name of assignment project	or	Resettlement Policy Framework for the National Water Development Programme
Year		2007
Location		Country Wide - Malawi
Client		Ministry of Water Development & Irrigation
Main project features		The RPF was used as a guide for the development of compensation, resettlement and rehabilitation plans where people's settlement and livelihoods were affected by the NWDP II
Positions held:		Team Leader
Activities performed		(a) Development of principles and objectives governing resettlement preparation and implementation, (b) Development of the process for preparation, review and approval of resettlement action plans, (c) Development of methodology and procedure for estimation of displacement and categories of affected persons, (d) Development of methods for valuing assets affected by resettlement,

		(e) Drafting of the legal framework and eligibility for affected persons, (f) Designing of grievance redress process and mechanisms, and (g) Development of resettlement management and monitoring plans.
Name of assignment project	of or	Preparation of Environmental Impact Assessment (EIA) Guidelines for the Water Sector for Malawi
Year		2006
Location		Lilongwe, Malawi
Client		Government of Malawi, Environmental Affairs Department
Main project features		The Environmental Affairs Department required Environmental Impact Assessment Guidelines for preparation of Environmental Impact Assessment for the Water Sector.
Positions held:		Team Leader
Activities performed		Activities included desk studies, field investigations, stakeholder and public consultations, environmental and social impact assessment and analysis, development of the EIA process for the water sector, development of generic environmental management and monitoring plans and drafting the EIA Guidelines
Name of assignment project	of or	Preparation of an environmental and social management plan for the Mzimba Integrated Urban Water and Sanitation Project.
Year		2015
Location		Mzimba, Malawi
Client		Northern Region Water Board
Main project features		The Mzimba water supply scheme is intended to be upgraded and expanded to supply water to the proposed Mombera University project site. This expansion of the scheme is to be implemented under the Mzimba Integrated Urban Water and Sanitation Project. Along with the expansion of the scheme, other project components include; the construction of new water points within Mzimba Town, construction of sanitation facilities in schools, health centres and market places, construction of a liquid waste treatment plant and a solid waste management facility as well as the training of communities to improve their knowledge on sanitation and hygiene and the training of artisans to enhance their capacity for effective construction and maintenance of infrastructure. The main objective of the project is to ensure improved water supply services delivery by the Mzimba water supply scheme as well as improved sanitation within the Town in light of the coming in of the Mombera University project.
Positions held:		Team Leader
Activities performed		The consultant prepared the Environmental and Social Impact Assessment Report for the project through upgrading of the previous Environmental and Social Impact Assessment Report for the project produced in 2009. Further field investigations, public consultations and interviews of key stakeholder institutions were carried out. Preparation of the report also involved review of relevant literature and legislation which governs preparation of EIAs in Malawi, as well the African Development Bank Policies. Environmental and social impacts were predicted and assessed and Environmental Management and Monitoring Plans were prepared.

Name of assignment or project	Preparation of the Strategic Sanitation Plan for Mzuzu City, Rumphi Boma and Chintheche Centre for 2010 to 2025
Year	2009-2010
Location	Mzuzu City, Rumphi Boma and Chintheche Centre
Client	Northern Region Water Board
Main project features	The Strategic Sanitation Plan, for the period of 2010 to 2025, was the fourth and the last output of the sanitation planning for Mzuzu City, Rumphi Boma, and Chintheche Centre. The Plan presents the sanitation situation analysis; technology review and selection; sanitation coverage plan; institutional arrangements; and proposes the sanitation interventions' implementation plan for the three project areas. In addition, the plan presents the preliminary design, drawings and bills of quantities for the recommended sanitation interventions
Positions held:	Team Leader
Activities performed	<p>The plan was prepared through several stages, with the following background reports being produced as outputs for each stage:</p> <ul style="list-style-type: none"> • The Inception Report of July 15, 2009 • The Socio-economic Study, Baseline Assessment and Demand Assessment Report of 3 September, 2009 • The Preliminary Prioritized Interventions and Environmental and Social Screening Report of 22 December, 2009 <p>The Inception Report, captured details of the methodology, which was discussed with the Client, for developing the plan. Following approval of the Inception Report, the Socio-economic Study, Baseline Assessment and Demand Assessment Report was prepared. This report, which formed the basis for preparation of the Design Criteria, led to the preparation of the Preliminary Prioritized Interventions and Environmental and Social Screening Report, for the possible sanitation options.</p>

Name of assignment or project	Feasibility studies and design of wastewater treatment & waste management systems
Year	2014
Location	Malawi
Client	Malawi Mangoes (Operations) Ltd
Main project features	Malawi Mangoes (Operations) Limited (Registered Number: 11169, P.O. Box 31264, Lilongwe 3) was proposing to construct a fruit processing plant in Salima District, the Central Region of Malawi and had design principles that consultants adhered to in all work assignments. The proposed factory which was intended to become the biggest export oriented fruit processing plant in Malawi and SADC region at large was planned to process locally produced mangoes and bananas into puree for exports.
Positions held:	Team Leader
Activities	Activities included:

performed	<p>Conducting a feasibility study and recommending efficient and effective development and environmental management options for wastewater and waste management systems for the fruit processing plant in Salima at Kambwiri 2 Industrial Area.</p> <p>Defining the area requirements and locations of the wastewater treatment, waste management plants and establishing the commitment of the district assembly to provide land for the proposed developments.</p> <p>Identifying present wastewater and waste management systems and proposing integrated infrastructure planning and development.</p> <p>Exploring options and establishing the volumes of treated water for reuse in the plant or by the existing farmers in the surrounding area.</p> <p>Exploring and establishing volume of waste for reuse in waste management systems or by the existing farmers in the surrounding area.</p> <p>Developing best environmental friendly technological options for the design of water treatment and waste management systems.</p> <p>Providing an investment appraisal or CBA for the design options and making recommendations.</p> <p>The designs were meant to allow integration into the envisaged long-term Salima Town wastewater treatment and waste management development planning.</p> <p>Liaising with the Town Planning Committee on wastewater treatment and waste management systems options.</p> <p>Providing a monitoring and evaluation framework for improving environmental quality.</p> <p>Providing a framework for short, medium and long term administration and technical support for waste services.</p>
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Name of assignment or project	Preparation of An Environmental and Social Impact Assessment/Environmental and Social Management Plan for the Water Demand Management Project in Mzuzu City
Year	2014
Location	Malawi
Client	Plan Malawi, Mzuzu City Council, Northern Region Water Board, and Vitens Evides International (VEI)
Main project features	The main objective of the assignment was to conduct a detailed independent Environmental and Social Impact Assessment and prepare a Detailed Environmental Management Plan for all activities that were planned to be undertaken under the Water Demand Management Project which was aimed at sustainably improving access to WASH services in Mzuzu, especially for the low-income households. The assignment was aimed at ensuring that requisite environmental and social mitigation measures corresponding with national and international standards were recommended. The environmental and social impact study provided useful information on how the activities of the project could be designed and planned to avoid or mitigate negative impacts and to

	better capture anticipated environmental and social benefits.
Positions held:	Team Leader
Activities performed	<p>Activities included:</p> <ul style="list-style-type: none"> a) Identifying and assessing the environmental issues related to the water supply and sanitation project being implemented with a focus on water quantity, water quality, sustainability of water sources and ecological sanitation technologies b) Conducting Environmental analysis and preparing Environmental and Social Management Plan (ESMP) including a monitoring plan and environmental codes of practice to adequately address the identified issues.

Name of assignment or project	Environmental impact assessment for proposed new waste disposal facility
Year	2014
Location	Fombe, traditional authority Kasisi in Chikhwawa district, Malawi
Client	PressCane Limited
Main project features	<p>Ethanol production from sugarcane molasses by Presscane utilizes high volumes of water resulting into high volumes of vinasse (distillery effluent) which is disposed of in evaporation ponds. The plant capacity required that PressCane developed eleven evaporation ponds to provide adequate time for each pond to naturally evaporate before beginning of next production season. PressCane had managed to develop only nine evaporation ponds due to land limitation at the area. The situation affected the operations negatively since there was no adequate time for the effluent to completely evaporate as such the overstayed effluent and sludge produces foul smell affecting the surrounding community. The smell had been compounded by the decomposition of molasses which were dumped in one of the ponds, due to lack of storage space before the plant was commissioned. The decomposing molasses was the main source of the foul smell.</p> <p>The situation forced PressCane to look for extra land for disposing sludge from the problematic pond and future use for accumulated sludge from the other eight ponds. The sludge would be removed before the start of every production season. An EIA was required for the proposed site before proceeding with the project.</p>
Positions held:	Team Leader
Activities performed	<p>Activities included:</p> <p>Examining the existing physical and socio-economical conditions of the proposed area;</p> <p>Providing a site specific-map of the area;</p> <p>Describing the major construction and operation activities that will be undertaken in the implementation of the project;</p> <p>Identifying the actual short and long term environmental impacts associated with the project, focusing on both the positive and negative effects as well as effects to the biophysical, social, economic and cultural components of the environment;</p> <p>Prescribing appropriate measures to eliminate, reduce, or mitigate the identified negative impacts identified including the measures to enhance the positive effects;</p> <p>Proposing an Environmental Management Plan for the project;</p> <p>Proposing an Environmental Monitoring Plan for the project</p>

Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any wilful misstatement described herein may lead to my disqualification or dismissal, if engaged.



Date: 13 July 2017

Full name of authorized representative: KENT KAFATIA

Expert's contact information: kentkafatia@gmail.com phone 01 750 094, Cell 0999 831 595, 0888 831 595

Annex B

ERM Impact Assessment Methodology

B1

IMPACT ASSESSMENT METHODOLOGY

B1.1

INTRODUCTION

This *chapter* of the Impact Assessment (IA) Report presents the methodology used to conduct the IA for the Project. The IA methodology follows the overall approach illustrated in *Figure 1-1*. The IA has been undertaken following a systematic process that predicts and evaluates the impacts the Project could have on aspects of the physical, biological, socio economic and cultural environment, and identified measures that the Project will take to avoid, minimise/reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where possible. The stages of the IA process are described in the sections below.

Figure 1-1 Impact Assessment Process

ENVIRONMENTAL & SOCIAL IMPACT ASSESSMENT METHODOLOGY

Impact Assessment Process

1. Identify Impact

The scoping process identifies the potentially most important/significant impacts and effects for the assessment to address. This is done through a combination of:

- looking at the nature of the project activities and the impacts they will give rise to;
- looking at the project's environmental and social setting and its aspects which are likely to be most sensitive/vulnerable to impacts from the project;
- applying professional understanding gained from the evidence base; and
- considering inputs from stakeholders through consultation.

Decisions are then made on which impacts and effects to assess or to prioritise in the assessment (scoping in and scoping out) and how to assess them (proposed methodology).

2. Predict Magnitude

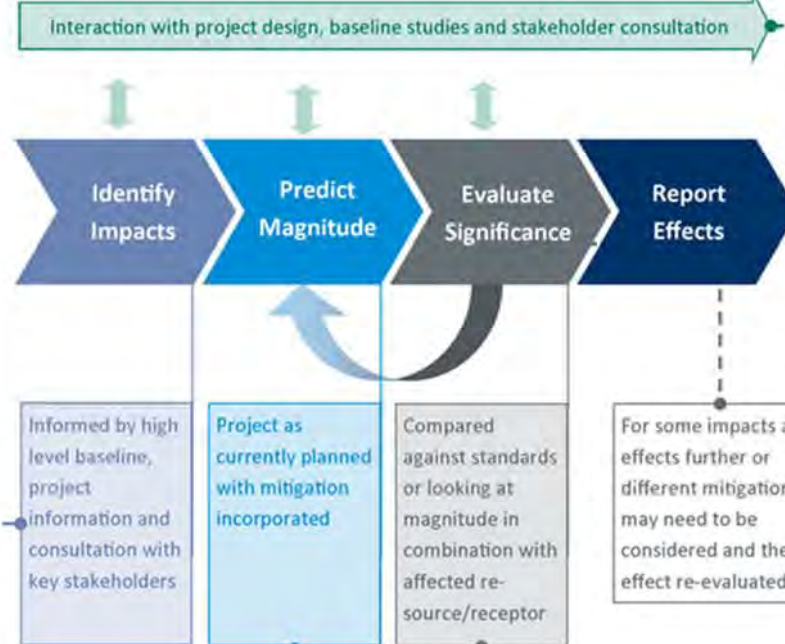
The project's impacts are quantified in terms of, for example:

- change in noise levels at a residence;
- level of interaction of Project construction and operational vessels with shipping and navigation and other marine users;
- dust and PM₁₀ exposure to nearby sensitive receptors including residents, tourists at the cruise terminal and nearby schools; and
- numbers of jobs generated in the local economy.

In predicting magnitude the effect of all the project mitigation in place is taken into account. For some impacts, especially noise and air pollution, significance can be assessed directly against numerical criteria and standards. For exceedances further mitigation must be incorporated by the Project to reduce the magnitude of the impact (and significance of its effect).

For other impacts nominal levels of magnitude (eg small, medium, large) may be adopted based on widely recognised factors such as: the nature of a change (what is affected and how); its size, scale or intensity; its geographical extent and distribution; its duration, frequency, reversibility.

Some activities will result in changes to the environment that may be immeasurable or undetectable or within the range of normal natural variation. Such changes will be assessed as having no impact or to be of negligible magnitude and will not lead to significant effects.



Describe Baseline

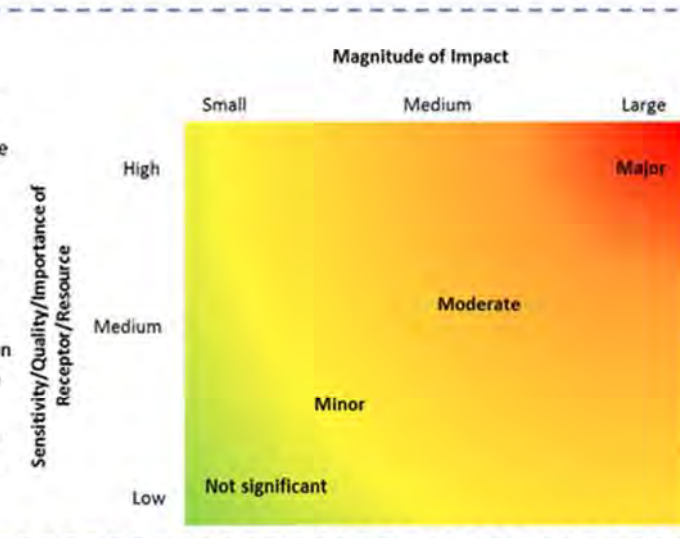
Baseline data are collected to better understand the potentially most important impacts and effects identified in scoping. Baseline data may quantify existing exposure levels (e.g. for noise and air pollution), identify sensitive receptors such as residents, nearby schools and aquatic species.

Where a baseline aspect can not be quantified then nominal levels of importance, quality of value (low, medium, high) are assigned based on widely accepted criteria in fields such as ecology, cultural heritage, landscape and socioeconomic impact. Levels of sensitivity may be assigned in a similar way, but noting that sensitivity is a characteristic linked to how a receptor responds to an impact (and the magnitude of that impact). For example, avifauna may be of high importance (protected), highly sensitive to loss of habitat and food sources, moderately sensitive to construction noise and of low sensitivity to traffic movements.

3. Evaluate Significance

In evaluating significance, the EIA process is seeking to inform regulators and stakeholders about the effects of the Project in a way that helps them make decisions on whether to approve and allows them to develop suitable conditions to attach to an approval. The evaluation of significance should ideally demonstrate legal compliance at least (eg compliance with quantified standards, avoidance of effects on legally protected resources).

In the absence of quantified standards, impacts/effects can be evaluated through considering the magnitude of an impact in combination with the importance/quality/value (and sometimes sensitivity) of the receptor or resource that is affected. Moderate or major impacts/effects may warrant re-examination to see if an impact magnitude can be reduced further. Different mitigation options may be examined and the reasons for selecting one and rejecting others explained. Some impacts/effects that cannot be adequately mitigated may need to be addressed through the consideration of offsets or compensation. The evaluation process may go through more than one iteration of working with project design to develop suitable mitigation and re-evaluating impacts and effects.



B1.2

SCOPING

Scoping has been undertaken (submitted to the Lenders in September 2015 Report) to identify the potential Area of Influence (AoI) for the Project. In addition, the potential interactions between the Project and resources/receptors in the AoI are identified as well as the impacts that could result from these interactions, in order to prioritize these in terms of their likely significance.

This stage is intended to ensure that the IA focuses on those issues that are most important for design, decision making and stakeholder interest. The findings of the Scoping Report are summarised in *the* IA Report.

The list below presents the resources/receptors considered in the Scoping stage:

- Air Quality and Fugitive Dust Emissions;
- Landscape and Visual Amenity;
- Water Quality and Resource (Surface and Ground water);
- Land Contamination;
- Noise and Vibration;
- Soil Erosion;
- Waste including hazardous waste;
- Change of Land Use;
- Avian Species;
- Terrestrial Flora/Fauna;
- Community Health and Safety;
- Systems for Land Tenure and Distribution;
- Economy and Livelihoods;
- In migration;
- Infrastructure and services;
- Cultural Heritage;
- Ecosystem Services;
- Cumulative Impacts;
- Aquatic Species; and
- Construction Camps and Workers Presence.

Each of these receptors was considered in relation to project activities and whether impacts on these receptors would be investigated further in the ESIA. The outcome of the scoping process is described in the ESIA Report.

B1.3

PROJECT DESCRIPTION

In order to set out the scope of the Project features and activities, with particular reference to the aspects which can impact on the environment, a Project Description is prepared. Details of the Project facilities' design characteristics, as well as planned and unplanned Project activities, are

provided in the ESIA Report. This has been developed with the Project team and builds on information initially prepared for the Scoping Report.

B1.4 ***BASELINE CONDITIONS***

To provide a context within which the impacts of the Project can be assessed, a description of physical, biological, socio economic and cultural conditions that would be expected to prevail in the absence of the Project is presented. The baseline includes information on all resources/receptors that were identified during scoping as having the potential to be significantly affected by the Project.

B1.5 ***STAKEHOLDER ENGAGEMENT***

An effective IA process requires engagement with relevant stakeholder throughout the key stages. This assists in understanding stakeholder views on the Project and in identifying issues that should be taken into account in the prediction and evaluation of impacts. Details of the Stakeholder Engagement activities undertaken for this Project to date are presented in the ESIA Report.

B1.6 ***IMPACT ASSESSMENT***

Impact identification and assessment starts with scoping and continues through the remainder of the IA process. The principal IA steps of IA comprise:

- *Impact prediction:* to determine what could potentially happen to resources/receptors as a consequence of the Project and its associated activities;
- *Impact evaluation:* to evaluate the significance of the predicted impacts by considering their magnitude and likelihood of occurrence, and the sensitivity, value, and importance of the affected resource or receptor;
- *Mitigation and enhancement:* to identify appropriate and justified measures to mitigate negative impacts and enhance positive impacts; and
- *Residual impact evaluation:* to evaluate the significance of impacts assuming effective implementation of mitigation and enhancement measures.

B1.7 ***PREDICTION OF IMPACTS***

Prediction of impacts is essentially an objective exercise to determine what is likely to happen to the environment as a consequence of the Project and its associated activities. From the potentially significant interactions identified in

Scoping, the impacts to the various resources/receptors are elaborated and evaluated. The diverse range of potential impacts are considered in the IA process typically results in a wide range of prediction methods being used, including quantitative, semi quantitative and qualitative techniques.

B1.8 EVALUATION OF IMPACTS

Once the prediction of impacts is complete, each impact is described in terms of its various relevant characteristics (e.g. type, scale, duration, frequency and extent). The terminology used to describe impact characteristics is shown in *Table 1.1*.

Table 1.1 *Impact Characteristic Terminology*

Characteristic	Definition	Designations
Type	A descriptor indicating the relationship of the impact to the Project (in terms of cause and effect)	Direct Indirect Induced
Extent	The 'reach' of the impact (e.g. confined to a small area around the Project Footprint, projected for several km etc.)	Local Regional International
Duration	The time period over which a resource/receptor is affected	Temporary Short term Long term Permanent
Scale	The size of the impact (e.g. the size of the area damaged or impacted, the fraction of a resource that is lost or affected, etc.)	No fixed designation, intended to be a numerical value or a qualitative description of intensity
Frequency	A measure of the constancy or periodicity of the impact	No fixed designation, intended to be a numerical value or a qualitative description

The definitions for the type designations are shown in *Table 1.2*. Definitions for the other designations are resource/receptor specific and are discussed in the resource/receptor specific impact assessment chapters presented later in this IA Report.

Table 1.2 *Impact Type Definitions*

Designation	Definition
<i>Type</i>	
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g. between occupation of a plot of land and the habitats which are affected).
Indirect	Impacts that follow on from the direct interactions between the Project and its environment as a result of subsequent interactions within the environment (e.g. viability of a species population resulting from loss of part of a habitat as a result of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen as a consequence of the Project (e.g. influx of camp followers resulting from the importation of a large Project workforce).

The above characteristics and definitions apply to planned and unplanned events. An additional characteristic that pertains only to unplanned events is *likelihood*. The *likelihood* of an unplanned event occurring is designated using a qualitative scale, as described in *Table 1.3*.

Table 1.3 *Definitions for Likelihood Designations*

Likelihood	Definition
Unlikely	The event is unlikely but may occur at some time during normal operating conditions
Possible	The event is likely to occur at some time during normal operating conditions.
Likely	The event will occur at normal operating conditions (i.e. it is essentially inevitable).

Once an impact's characteristics are defined, the next step in the impact assessment phase is to assign each impact a 'magnitude'. Magnitude is typically a function of some combination (depending on the resource/receptor in question) of the following impact characteristics:

- Extent
- Duration
- Scale
- Frequency

Additionally, for unplanned events only, magnitude incorporates the 'likelihood' factor discussed above. Magnitude essentially describes the intensity of the change that is predicted to occur in the resource/receptor as a result of the impact. As discussed above, the magnitude designations themselves are universally consistent, but the descriptions for these designations vary on a resource/receptor-by-resource/receptor basis. The universal magnitude designations are:

- Positive
- Negligible
- Small
- Medium
- Large

In the case of a *positive* impact, no magnitude designation (aside from 'positive') is assigned. It is considered sufficient for the purpose of the IA to indicate that the Project is expected to result in a *positive* impact, without characterising the exact degree of positive change likely to occur.

In the case of impacts resulting from unplanned events, the same resource/receptor-specific approach to concluding a magnitude designation is utilised, but the 'likelihood' factor is considered, together with the other impact characteristics, when assigning a magnitude designation.

In addition to characterising the magnitude of impact, the other principal impact evaluation step is definition of the sensitivity, vulnerability and

importance of the impacted resource/receptor. There are a range of factors to be taken into account when defining the sensitivity/vulnerability/importance of the resource/receptor, which may be physical, biological, cultural or human. Other factors may also be considered when characterising sensitivity/vulnerability/importance, such as legal protection, government policy, stakeholder views and economic value.

As in the case of magnitude, the sensitivity/vulnerability/importance designations themselves are universally consistent, but the definitions for these designations vary on a resource/receptor basis. The sensitivity/vulnerability/importance designations used herein for all resources/receptors are:

- Low
- Medium
- High

Once magnitude of impact and sensitivity/vulnerability/importance of resource/receptor have been characterised, the significance can be assigned for each impact. Impact significance is designated using the matrix shown in *Figure 1-2*.

Figure 1-2 *Impact Significance*

		Sensitivity / Vulnerability / Importance of Resource / Receptor		
		Low	Medium	High
Magnitude of Impact	Negligible	Negligible	Negligible	Negligible
	Small	Negligible	Minor	Moderate
	Medium	Minor	Moderate	Major
	Large	Moderate	Major	Major

Source: ERM (2016)

The matrix applies universally to all resources/receptors, and all impacts to these resources/receptors, as the resource/receptor-specific considerations are factored into the assignment of magnitude and sensitivity, vulnerability and importance designations that enter into the matrix. *Box 1.1* provides a context for what the various impact significance ratings signify.

It is important to note that impact prediction and evaluation have taken into account any embedded controls (i.e., physical or procedural controls that are already planned as part of the Project design, regardless of the results of the IA Process). An example of an embedded control is a standard acoustic enclosure that is designed to be installed around a piece of major equipment.

This avoids the situation where an impact is assigned a magnitude based on a hypothetical version of the Project that considers none of the embedded controls.

Box 1.1

Context of Impact Significances

An impact of *negligible* significance is one where a resource/receptor (including people) will essentially not be affected in any way by a particular activity or the predicted effect is deemed to be 'imperceptible' or is indistinguishable from natural background variations.

An impact of *minor* significance is one where a resource/receptor will experience a noticeable effect, but the impact magnitude is sufficiently small and/or the resource/receptor is of low sensitivity/ vulnerability/ importance. In either case, the magnitude should be well within applicable standards.

An impact of *moderate* significance has an impact magnitude that is within applicable standards, but falls somewhere in the range from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly, to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is as low as reasonably practicable (ALARP). This does not necessarily mean that impacts of moderate significance have to be reduced to minor, but that moderate impacts are being managed effectively and efficiently.

An impact of *major* significance is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of IA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted (i.e. ALARP has been applied). An example might be the visual impact of a facility. It is then the function of regulators and stakeholders to weigh such negative factors against the positive ones, such as employment, in coming to a decision on the Project.

B1.9

IDENTIFICATION OF MITIGATION AND ENHANCEMENT MEASURES

Once the significance of an impact has been characterised, the next step is to evaluate what mitigation and enhancement measures are warranted. For the purposes of this IA, ERM has adopted the following Mitigation Hierarchy:

- *Avoid at Source, Reduce at Source*: avoiding or reducing at source through the design of the Project (e.g., avoiding by siting or re-routing activity away from sensitive areas or reducing by restricting the working area or changing the time of the activity).
- *Abate on Site*: add something to the design to abate the impact (e.g., pollution control equipment, traffic controls, perimeter screening and landscaping).
- *Abate at Receptor*: if an impact cannot be abated on-site then control measures can be implemented off-site (e.g., noise barriers to reduce noise impact at a nearby residence or fencing to prevent animals straying onto the site).

- *Repair or Remedy*: some impacts involve unavoidable damage to a resource (e.g. agricultural land and forestry due to creating access, work camps or materials storage areas) and these impacts can be addressed through repair, restoration or reinstatement measures.
- *Compensate in Kind, Compensate Through Other Means*: where other mitigation approaches are not possible or fully effective, then compensation for loss, damage and disturbance might be appropriate (e.g., planting to replace damaged vegetation, financial compensation for damaged crops or providing community facilities for loss of fisheries access, recreation and amenity space).

The priority in mitigation for the Project is to first apply mitigation measures to the source of the impact (i.e., to avoid or reduce the magnitude of the impact from the associated Project activity), and then to address the resultant effect to the resource/receptor via abatement or compensatory measures or offsets (i.e., to reduce the significance of the effect once all reasonably practicable mitigations have been applied to reduce the impact magnitude).

B1.10 *RESIDUAL IMPACT EVALUATION*

Once mitigation and enhancement measures are declared, the next step in the IA Process is to assign residual impact significance. This is essentially a repeat of the impact assessment steps discussed above, considering the implementation of the proposed mitigation and enhancement measures.

B1.11 *MANAGEMENT, MONITORING AND AUDIT*

The final stage in the IA Process is definition of the basic management and monitoring measures that are needed to identify whether: a) impacts or their associated Project components remain in conformance with applicable standards; and b) mitigation measures are effectively addressing impacts and compensatory measures and offsets are reducing effects to the extent predicted.

An ESMP Framework, which is a summary of all actions which the Project Proponent has committed to executing with respect to environmental/social/health performance for the Project, is also included as part of the IA Report. This includes mitigation measures, compensatory measures and offsets and management and monitoring activities.

Annex C

Specialist Reports

**BASELINE BIODIVERSITY REPORT FOR JCM SOLAR PHOTOVOLTAIC
PROJECT IN SALIMA DISTRICT**

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Environment and Natural Resources Management (ERM)

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1. BIODIVERSITY BASELINE

1.1 INTRODUCTION

The Proposed Solar Photovoltaic (PV) Plant Project will be built in Salima District in the Central Region of Malawi. The district is located at a distance of about 103 Km East of Lilongwe City, which is the Capital City of Malawi. The district shares its boundaries with Dedza District to the South, Lilongwe District the West, Dowa District to the South West and Nkhotakota District to the North. Lake Malawi covers entire eastern part of the district. The total land area of the district is 2,196 Km². There are some variations in landform and altitude for the district. The land form ranges from the rift valley floor, especially along the lake where the land is characterized by floodplain areas to hilly areas especially in Traditional Authority (T/A) Mwanza in the northwest. The rift valley floor has altitudes which range from 200 to 500 m above the sea level; whereas the upland has altitudes ranging from 500 m to 1000 m above the sea level. The major rivers in the district are Chitala, Dwele, Chilowa, Lingadzi, Ngodzi, Lifidzi, Liwadzi, Lilongwe, Lipimbi and Linthipe (Malawi Government, 2016).

The district has tropical continental climate with mean annual temperature of 22°C. The highest temperatures, which reach as high as 33°C, are experienced in the month of October; while the lowest temperatures, reaching 12°C, are experienced between May and July. The district has a forest cover of 18,150ha. representing 8.3% of the total land area. The district has of forest reserves and mixed woodlands on customary land. The project area which consists of the project area and the transmission line is under subsistence agriculture with some scattered trees such as *Pterocarpus angolensis* (Mlombwa), *Pericopsis angolensis* (Muwanga), *Albizia labbeck* (Mtangatanga), *Brachsyegia* spp. (Tsamba/Mombo), *Piliostigma thonningii* (Chitimbe), *Tereminalia serecea* (Naphini), *Burkeya africana* (Mkalati), *Khaya anthotheca* (M'bawa), *Faibhebia albida*, *Adina microcephala* (Mweya), and *Syzygium* species (Katope) among others.

The Proposed Solar Photovoltaic (PV) Plant Project will be built in Salima District in the Central Region of Malawi. The district is located at a distance of about 103 Km East of Lilongwe City, which is the Capital City of Malawi. The total land area earmarked for the project site is 168ha. and is found in Village Headman Kanzimbe. The Village is under Group Village Headman Kanzimbe in T/A Kalonga. The project site is adjacent to Mayambo Village and is 20km North West of salima Township. The electricity to be generated will be sold to Electricity Supply Corporation of Malawi (ESCOM), which will then be transferred to the national grid through the existing ESCOM Substation at Salima located along the M5 and M14 roads.

As prescribed under Section 24 (1) of the Environment Management Act of 1996, the types of projects for which an Environmental Impact Assessment (EIA) may be required include projects that focus on energy generation, transmission and storage. These projects among others things include:

- Construction or expansion of electrical generating activities designed to operate at greater than 4MW or, in the case hydro-electric generating activities, where the total head is greater than 20m or where there is a firm flow of 100 cubic metres per second.
- Construction of electrical transmission facilities operating at a voltage of 132 kV or greater.
- Construction or expansion of oil and gas pipelines longer than 1km.

- Construction or expansion of storage facilities (excluding service stations) for oil, gas, petrol or diesel located within 3km of commercial, industrial or residential areas and with a storage capacity of 500,000 litres or more.
- All activities associated with nuclear power development.

The proposed project, falls within the above category of prescribed projects and by Malawi standards, requires an Environmental and Social Impact Assessment (ESIA). Therefore, the biodiversity baseline survey that was conducted for this proposed project forms part of the ESIA of the proposed Solar PV Project in Salima.

1.1.1 Biodiversity Baseline Survey Approach and Methodology

1.1.1.1 Approach

The approach to this study was to assess the biodiversity components that occur on the proposed project site, which is the footprint of the project, including the transmission line; the terrestrial biodiversity species; the present ecological state of the site; and the ecosystem services that occur on the project site.

The scope of the survey included to:

- Identify key components of terrestrial and aquatic habitats of the proposed project site;
- Identify key components of the biodiversity that occur at the proposed project site;
- Identify sensitive habitats, including migratory corridors for wildlife;
- Identify species for each component of the biodiversity that occur at the project site;
- Assess threatened and endemic species of biodiversity;
- Assess the Present Ecological State of the proposed project site using the IFC PS 6 Criteria;
- Identify Ecosystem Services present at the project site;
- Assess and identify impacts of the proposed project on biodiversity, habitats and ecosystem services; and
- Develop impacts mitigation measures.

1.1.1.2 Planning

A planning team, meeting to discuss the project plan and methodology, including plan for the field survey was held in Lilongwe on 24th April 2018.

1.1.1.3 Literature Review

Relevant sources of available information that were reviewed and used for this study included the following:

- National Guidelines for Environmental Impact Assessment (EIA) (Government of Malawi, 1997);
- Identification guides, including:
 - Terrestrial Vegetation: Baunman (2005), Msekandian & Mlangeni (2002);
 - Aquatic Vegetation: Cook, (2004)
 - Birds: Dowsett-Lemaire and Dowsett, (2006);
 - Mammals: Monadjem, (2010);
- Various databases and websites, including:
 - Flora Zambesiaca (<http://apps.kew.org/efloras/search.do>)

- The International Union for the Conservation of Nature (IUCN) Red list of Threatened species (<http://www.iucnredlist.org>);
- Global Biodiversity Information Facility (GBIF) database (<http://data.gbif.org>);
- Fishbase (www.fishbase.org);
- Avibase (<http://www.africanbirdclub.org/countries/checklists/download>) and
- https://www.ifc.org/wps/wcm/connect/bff0a28049a790d6b835faa8c6a8312a/PS6_English_2012.pdf?MOD=AJPERES

1.1.2 Field Surveys

One field survey was undertaken as follows:

Late wet season (25-26 April, 2018). This field survey was aimed to collect biodiversity baseline data; assess sensitive habitats; identify present ecological state of the proposed project site; and ecosystem services that are found on the site.

1.1.2.1 Flora

Assessment of flora species was done using transect walks across the proposed project site and in various vegetation communities. All flora species that were seen during the field work were identified and recorded in a field notebook. Plants that could not be identified onsite were photographed or specimens were collected for identification at the place of lodging, using the Flora Zambesiaca volumes and various field guides. Particular attention was paid to species of conservation concern (i.e. endemic, protected and endangered species).

1.1.2.2 Birds

The standardized search method of Watson (2003) was used to survey birds by walking slowly through vegetation, preferably along paths or tracks and recording the species seen or heard within 20-minute segments in each vegetation community. Playback calls were used to encourage cryptic species to reveal themselves. This was done to supplement visual observations.

1.1.2.3 Mammals

Mammals were recorded incidentally while surveying vegetation. Indirect evidence such as spoor or dung was used to confirm presence of species, in conjunction with limited visual or audio confirmation.

1.1.2.4 Present Ecological State

Assessment of the Present Ecological State of the proposed project site was done using physical observation, professional judgement and based on subjective assessment of expected and observed abundance and diversity of flora and fauna, including insects. The results were classified into one of the six categories, ranging from *Unimpaired* (Category A) to *Very Severely Impaired or Modified* (Category F) of the ecosystem. The assessment and classification of the present state of the ecosystem was adopted using Guidelines of IFS PS6 (Table 1-1).

Table 1-1. Guidelines used to assess the Present Ecological State of terrestrial and riparian ecosystems of the proposed project area

Category	Description
A	<p><i>Unmodified</i></p> <ul style="list-style-type: none"> • natural diversity of taxa, and; • numerous sensitive taxa, and • abundance as expected under natural conditions; • no taxa dominating each other, and; • no alien invasive species
B	<p><i>Slightly Modified</i></p> <ul style="list-style-type: none"> • As above, but fewer sensitive taxa and slightly lower taxa, and; • No alien invasive species
C	<p><i>Moderately Modified</i></p> <ul style="list-style-type: none"> • Moderate diversity of taxa relative to diversity expected under natural conditions, and; • moderate numbers of sensitive taxa, or; • moderate reduction in abundance of some or all taxa relative to that expected under natural conditions, and; • alien invasive species may be present.
D	<p><i>Considerably Modified</i></p> <ul style="list-style-type: none"> • low diversity of taxa relative to diversity expected under natural conditions, and; • mostly tolerant taxa, and; • considerable reduction in abundance of some or all taxa relative to the expected under natural conditions, and; • more than one taxa dominating other taxa for extended periods, and; • alien invasive species may be common.
E	<p><i>Severely Modified</i></p> <ul style="list-style-type: none"> • very low diversity of taxa relative to diversity expected under natural conditions, and; • only tolerant taxa present, or; • severe reduction in abundance of some or all taxa relative to that expected under natural conditions, and; • only one taxon dominating other taxa for extended periods, and; • alien invasive species may be abundant.
F	<p><i>Very Severely Modified</i></p> <ul style="list-style-type: none"> • as above under Category E, but with Very Severe reduction in taxa diversity and abundance.

1.1.2.5 Ecosystem Services (ES)

Ecosystem Services were identified by adopting a methodology and approach used by World Research Institute (WRI) (https://www.wri.org/sites/default/files/weaving_ecosystem_services_into_impact_assessment.pdf) coupled with data and information gathered during consultations held with local communities such as subsistence farmers, livestock herders and some local villagers.

1.1.2.6 Ecological Importance and Sensitive habitats

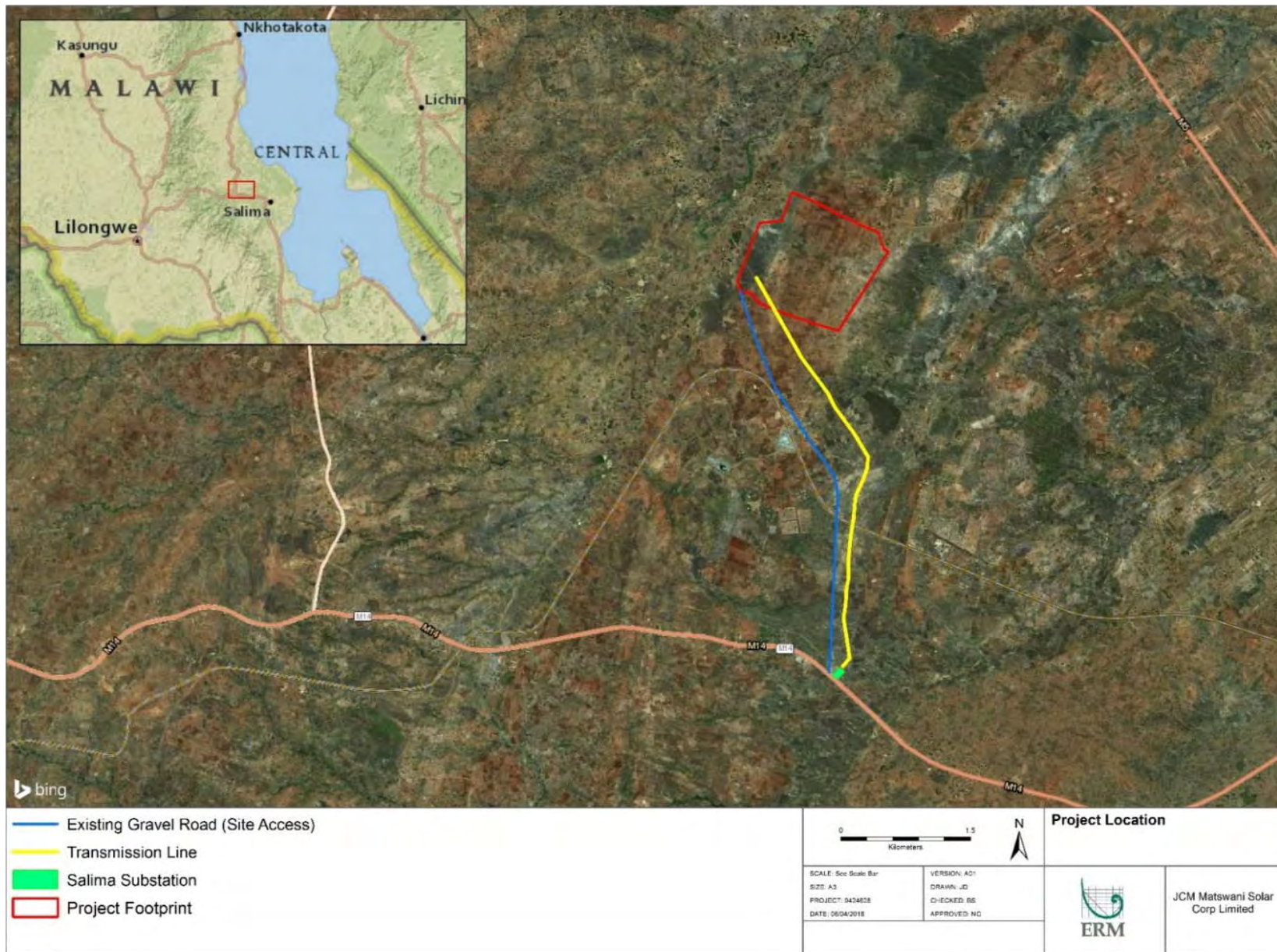
Identification of ecological importance and sensitive habitats was based on physical observations, professional judgement and the following Criteria:

- ***Threatened species.*** Observed assemblage or likely occurrence of Critically Endangered, Endangered or Vulnerable or Near-threatened species, as recognised by the IUCN (2001) or regional or national red list.
- ***Range-restricted species.*** Observed or likely occurrence of regionally or national endemic or range-restricted species.
- ***Migratory or Congregatory species.*** Observed or likely occurrence of such species.
- ***Key ecological processes.*** For example connectivity of landscape features needed to facilitate gene transfer.
- ***Key ecosystem services.*** Occurrence of key ecosystem services such as medical plants, potable water, livestock etc.

1.2 PROJECT LOCATION AND HABITAT MAP

1.2.1 Project Area

The project site, which is located in Village Headman Kanzimbe under T/A Kalonga covers an area of 168 ha or 1.68 Km² only (Fig.1-1). This report focuses on the potential footprint, which includes the transmission line.



SOURCE: Unrevealed

Path: C:\Users\Jeremy.Doherty\Documents\Projects\Q1626_JCM_Power_Matswani\001\Project Location.mxd

Figure 1-1: Map of the Project Site

1.2.2 Terrestrial Ecoregions

The proposed project site located in Village Headman Kanzimbe falls within a large terrestrial ecoregions zone known as Central Zambezi Miombo Woodland. This is one of Africa's largest Miombo ecoregions, which stretches across Central Africa below the equator and includes much of central and northern Malawi. This ecoregion has the highest plant species richness and diversity within the Miombo biome and has a higher proportion of Miombo woodland types. The soils are highly weathered, well-drained, highly leached and nutrient-poor, and tend to be acidic with low proportion of organic matter. The canopy is 10 to 20 m tall and is dominated by broad-leaved species of *Brachystegia*, *Julbernardia* and *Isobertinia*. The understory is lush, comprising grasses, broad-leaved shrubs and geophytes.

1.2.3 Vegetation types

At a finer scale, the proposed project area and the transmission line fall within a transition zone between two vegetation types. These are:

- ***Pterocarpus* – *Combretum* – *Pericopsis* *Dediduous* (Basement Complex) Tree Savannah.** The tree vegetation in this zone is largely confined to patches around Kafue Flats and near Lusaka in central Zambia. In Malawi, it occurs mostly between Lilongwe and Dedza on the central plateau, with an outlying area north-east of Kasungu. The deciduous trees *Pterocarpus angolensis* and various *Combretum* species are dominant, while other important trees are *Pericopsis angolensis*, *Terminalia sericea*, *Burkea africana*, *Xeroderris stuhlmannii* and *Acacia* species are dominant.
- ***Seasonal Valleyhead Wetland.*** This is a low-gradient, stream –source wetland area, mostly without defined channels. This wetland is located on the low land to the western part of the proposed project area (Fig. 2). It does not provide winter base flows, and is therefore not important for stream flow maintenance. This habitat is dominated with emergent grasses, sedges and aquatic plants such as *Leersia hexandra*, *Cyperus laevigatus* and *Scirpus littoralis* among others.

1.2.4 Habitats of the Project site

The project site is generally flat land and is predominantly used for subsistence agriculture. Crops cultivated in the area include maize, groundnuts, beans, cotton, pumpkin, soya and tobacco among others. Trees on the site include natural, planted and fruit trees such as mangoes, which are harvested. Within the project site, residents also rear livestock such as cattle, goats and pigs. One third of project site is made up of seasonal valleyhead wetland where livestock like cattle and goats are fed on grasses such as *Urochloa mossambicensis*, *Cyperus laevigatus* and *Scirpus littoralis* among others (Fig. 1-2: Habitat Map)

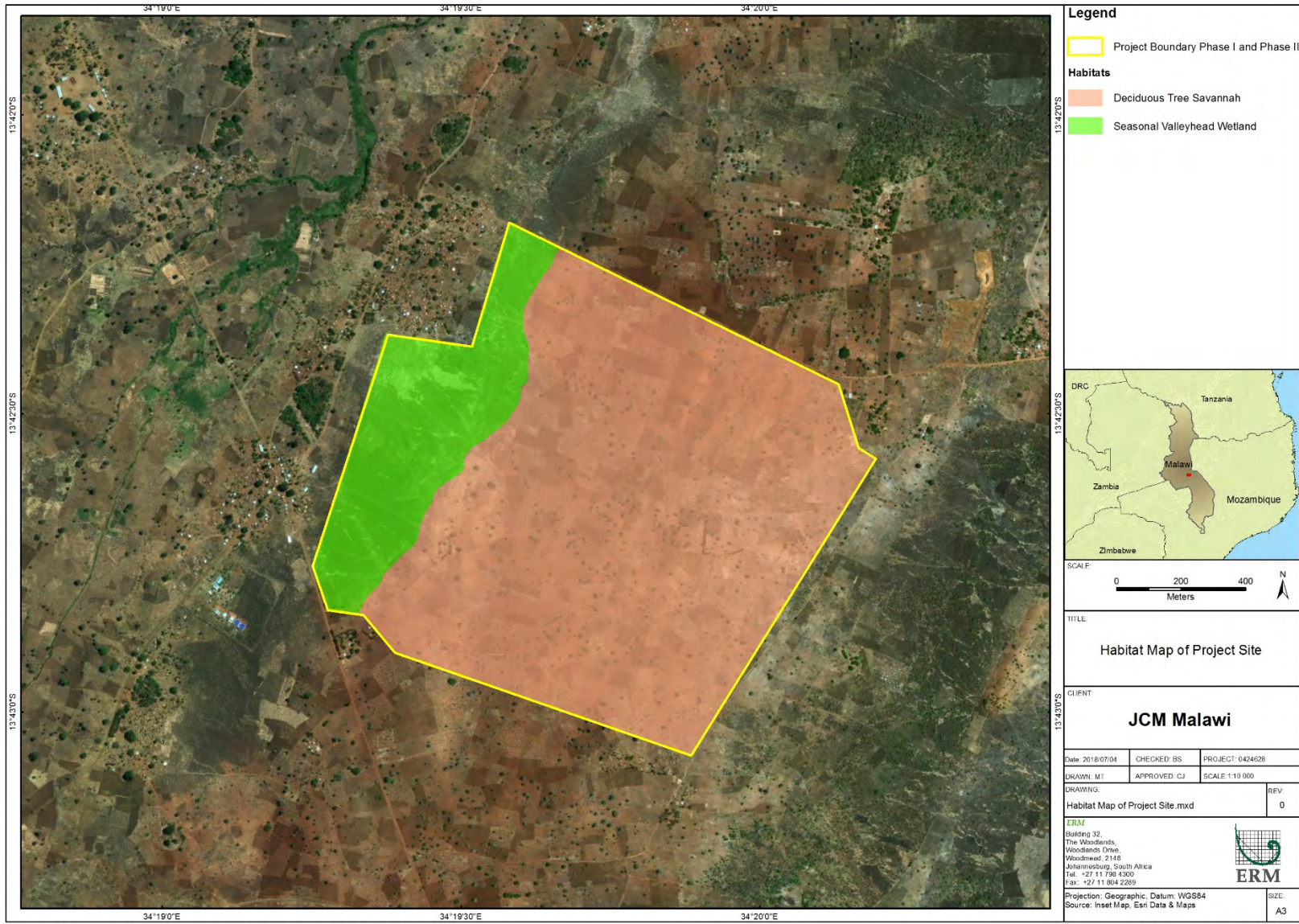


Figure 1-2: Habitat Map of the Project Site

1.3 PROJECT SITE

1.3.1 Habitat 1

1.3.1.1 An Overview of Habitat 1 of the Project Site

The habitat is generally flat land and is predominantly used for subsistence agriculture (Fig. 1-3). Crops cultivated on the project site include maize, cotton, sorghum, pumpkins, groundnuts, beans, soya and tobacco among others. Trees on the site include natural, planted and fruit trees such as mangoes which are harvested for consumption and sale. Within the project area, residents also rear livestock such as cattle, goats and pigs. Cattle and goats are fed on grasses that are found on the western part of the project proposed site, which is a seasonal valleyhead wetland (Fig. 1-4).



Figure 1-3: Part of Habitat 1 of the Project Site

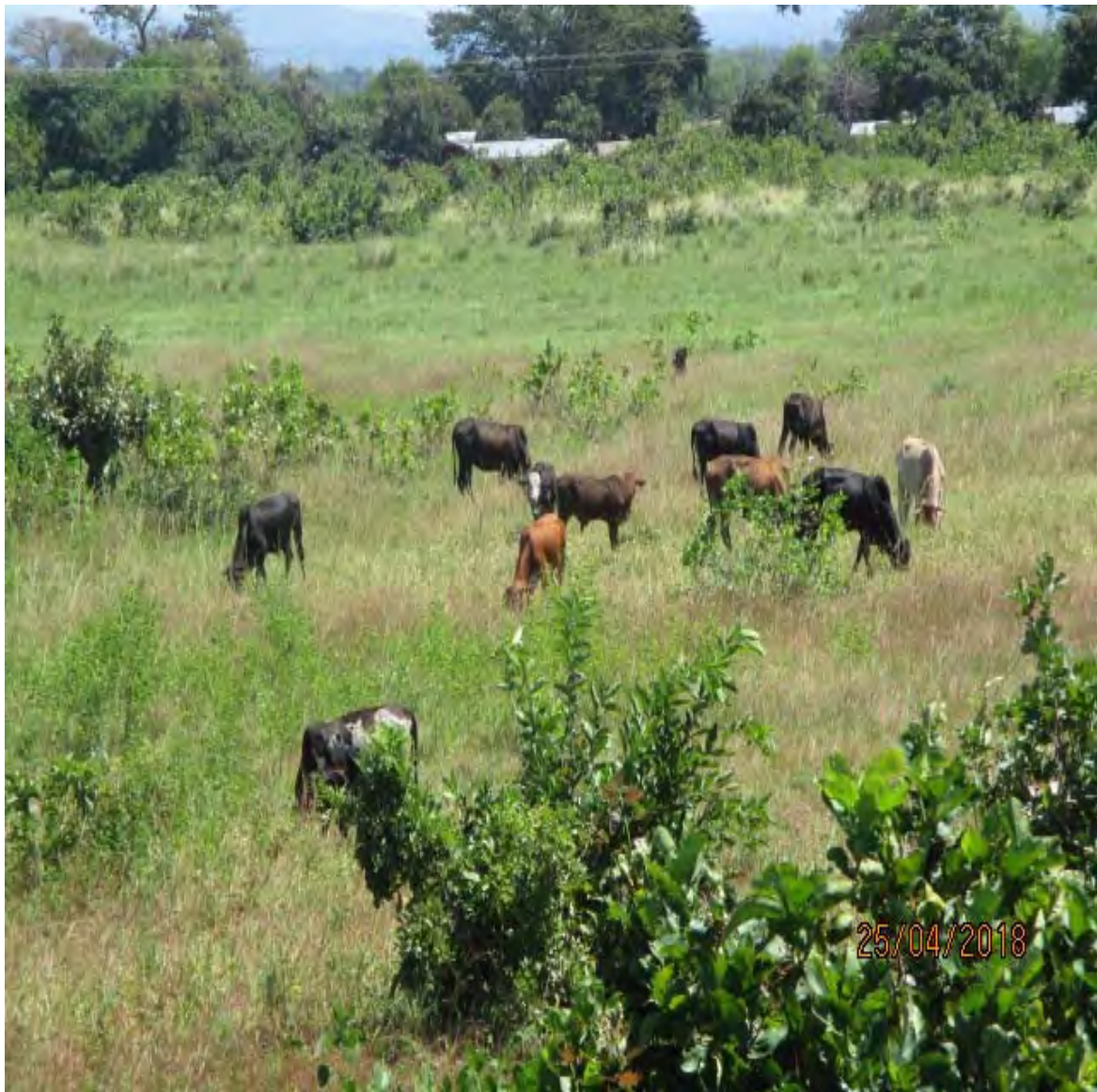


Figure 1-4: Part of the Seasonal Valleyhead Wetland of the Project Site

1.3.1.2 Fauna

Birds

(a) Species Composition

A total of eight (8) terrestrial and resident bird species recorded from the project site are indicated in Table 1-1.

Table 1-1: Bird Species Identified on the Project Site

Species Name	Local Name	Comment
<i>Myioparus griseigularis</i>	Grey-throated Tit-Flycatcher	Common resident bird and
<i>Pyconotus barbatus</i>	Common Bulbul	Common resident bird
<i>Streptopelia semiforquata</i>	Cape Turtle Dove	Resident bird

<i>Tauraco corythaix</i>	Kynsna Lourie	Rare bird
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Eucleptes psammocromius</i>	Mountain marsh Widowbird	Rare bird
<i>Cyanomitra verticalis</i>	Green headed Sunbird	Common resident bird

(b) Threatened and Endemic Species

No threatened or endemic species was recorded from the project site during the field work. All species listed above have a conservation status of Least Concern (LC), which entails that they are not at the verge of threatened in their habitats or in the region.

(c) Alien Species

No alien species of birds were recorded or observed in the project site during the field survey.

Mammals

Both large and small mammal species were not observed on the project site during the field survey and due to the continued subsistence agriculture, which has been taking place on the site, it was not expected to encounter any large mammal species. It is however, reported by communities that the project site harbour species of small mammals such as rodents, mice and common African hare.

(a) Species Composition

During the consultation with some subsistence farmers and local communities, it was reported that about five (5) species of small mammals do occur at the project site. The small mammal species reported to occur at the project site are presented in Table 1-2.

Table 1-2: Small Mammal Species Reported to occur at the Project Site

Species Name	Local Name	Comment
<i>Lophuromys flavopunctatus</i>	Rodent	Common resident mammal in cultivated lands
<i>Praomys delectorum</i>	Rodent	Common resident mammal in cultivated lands
<i>Mus</i> spp.	Mice	Common resident mammal in cultivated lands
<i>Lepus microtis</i>	African Hare	Rare
<i>Epomophorus wahlbergi</i>	Fruit bat	Rare

(b) Threatened and Endemic Species

No threatened or endemic species of mammal were recorded from the project site during the field work. The conservation status of *Lepus microtis* and *Epomophorus wahlbergi* is classified as Least Concern (LC) while other remaining species are not threatened.

(c) Alien Species

No alien species of mammal was observed by the project team or reported to occur at the proposed project site by the communities.

1.3.1.3 Flora

Most of the project site has been cultivated with dryland crops such as *Zea mays* (Corn Maize), *Sorghum dochna* (Sorghum), *Arachis hypogaea* (Groundnuts), *Gossypium arboreum* (Cotton), *Cucumis anguria* (Maroon Cucumber), *Citrullus lanatus* (Water Melon), *Mandifera indica* (Mango), *Glycine max* (Soya bean), *Ipomoea batatas* (Sweet Potato), *Cucumis melo* (Cucumber), and *Phaseolus vulgaris* (Common bean). The project site also has a good number of both indigenous and planted plant species, including fruit trees. Species of non- agro-biodiversity flora that were recorded from the project site are presented in Table 1-3.

(a) Species Composition

A total of sixty-four (64) terrestrial flora species were recorded from the project site and these are presented in Table 1-3. The most abundant species were *Faidherbia albida* (Msangu) and *Combretum* spp. (mswaswa).

Table 1-3: Flora Species Identified on the Project Site

Species Name	Local Name	Comment
<i>Faidherbia albida</i>	(Msangu) or Ana tree	Common tree typical of riparian habitat. Seed pods are eaten by livestock and the tree fix nitrogen in the soil.
<i>Pennisetum polystachion</i>	Udzu or Mission grass	Common grass, typically occurring in disturbed land and is invasive in some cases.
<i>Roettbolia cochinchinensis</i>	Udzu (Itch grass)	Common grass, typically occurring in disturbed land and is invasive in some cases.
<i>Acacia polystachya</i>	Black Wattle	Invasive plant species. Plant is used as feed for livestock
<i>Senna obtusifolia</i>	Sickle Senna	Alien tree, typically introduced by communities on farmlands.
<i>Vernonia glabra</i>	Cornflower	An annual herb, typical of secondary woodland
<i>Trichodesma zeylanicum</i>	Camel bush	Annual herb, typical of secondary woodland
<i>Philenoptera violacea</i>	Apple-leaf	Common tree, typical of dry Miombo woodland
<i>Melinis repens</i>	Natal grass	Perennial grass, typical of dryland and used for thatching houses
<i>Vernonia poskeana</i>	Sandveld vernonia	Annual herb, typical of secondary woodland
<i>Stereospermum kunthianum</i>	Zana	Small tree occurring in open woodland
<i>Crotalia virgata</i>	Rattlepod	Small annual herb, typical of open woodland and cultivated land.
<i>Corchorus olitorius</i>	Bush Okra	Small annual herb, typical of open cultivated land.
<i>Ceratotheca sesamoides</i>	Sesame	Wild weed and locally grows in cultivated land
<i>Merremia pinnata</i>	Kosrae	Common annual climber
<i>Siphonochilus aethiopicus</i>	Wild ginger	Annual herb, typical of cultivated land
<i>Albizia harveyi</i>	Sickle-leaved Albizia	Tree, typical of open woodland

Species Name	Local Name	Comment
<i>Leucas amartinicensis</i>	Whitewort	Annual herb, typical of cultivated land
<i>Panicum maximum</i>	Guinea grass	Grass, typical of cultivated and open woodland
<i>Cucumis sativus</i>	Cucumber	Cultivated fruit
<i>Hibiscus subdariffa</i>	Roselle	Annual woody-based Okra, used for making tonic drink
<i>Holarhena pubescens</i>	Kurchi	Annual tree, typical of open woodland
<i>Sclerocarya birrea</i>	Marula tree	Tree, typical of open secondary or primary forest
<i>Strychnos spinosa</i>	Green monkey orange	Shrub,
<i>Hackelochloa granularis</i>	Pit-scale Grass	Annual grass, typical of cultivated land
<i>Blepharis taitensis</i>	Creeping Blepharis	Annual herb, grows in cultivated land.
<i>Sorghum bicolor</i>	Sorghum	Perennial grass usually cultivated
<i>Pennisetum glaucum</i>	Millet	Annual grass usually cultivated.
<i>Codyla africana</i>	Wild Mango	Tree, typical of primary or secondary woodland
<i>Andropogon shirensis</i>	Beard Grass	Annual grass , typical of cultivated land
<i>Senna spectabilis</i>	Whitebark senna	Tree, introduced in cultivated land by humans
<i>Hyparrhenia filipendula</i>	Fine-hood Grass	Grass, typical of disturbed land used for thatching.
<i>Digitaria milanjiana</i>	Crabgrass	Grass, typical of disturbed land.
<i>Acacia sieberiana</i>	Paperbark acacia	Tree, typical of open woodland
<i>Heteropogon contortus</i>	Black spear grass	Perennial grass, typical of disturbed land.
<i>Lannea stuhlmanniana</i>	False marula	Tree, typical of closed woodland.
<i>Markhamia obtusifolia</i>	Golden bell-bean	Tree, typical of closed woodland.
<i>Combretum collinum</i>	Bushwill tree	Common fast growing shrubby tree, typical closed or open woodland
<i>Philenoptera bussei</i>	Narrow-lance pod	Common tree, typical of open woodland
<i>Vitex mombasae</i>	Chaste tree	Small tree, typical of open woodland and its fruits are edible
<i>Xeroderis stuhlmanii</i>	-	Common fast growing thorny tree, typical of open thicket woodland
<i>Moringa oleifera</i>	Moringa	Fast growing exotic tree, typical of cultivated land, its leaves and seeds are edible.
<i>Combretum zeyheri</i>	Bushwill sp.	Common fast growing shrubby tree species, typical of open woodland
<i>Melia azedarach</i>	Indian lilac tree	Common fast growing tree, growing disturbed land.
<i>Hibiscus esculentus</i>	Lady's fingers Okra	Annual herb, cultivated plant and is edible as relish
<i>Gmelina arborea</i>	Gmelina	Invasive tree species, planted on land as source of firewood.
<i>Bidens pilosa</i>	Black jack	Introduced weed annual herb,

Species Name	Local Name	Comment
		present as a result of soil disturbances
<i>Sorghum verticilliflorum</i>	Broomcorn	Grass, cultivated on land for food.
<i>Ptilostigma thonningii</i>	Monkey bread	Slow growing tree, typical of closed woodland.
<i>Bobgunia madagascariensis</i>	Snake bean tree	Fast growing tree, typical of moist condition.
<i>Adansonia digitata</i>	Baobaba tree	Common tree, typical of dry soils and hot areas. Leaf and seedpods are eaten by people as vegetable and fruits respectively.
<i>Cassia abbreviata</i>	Long-tail cassia	Fast growing tree, typical of open woodland.
<i>Dalbergia melanoxylon</i>	African black wood	Slow growing tree, typical of dry soils
<i>Combretum elaeagnoides</i>	Oleaster bushwill	Common fast growing shrubby tree, typical of moist conditions.
<i>Pterocarpus angolensis</i>	African teak tree	Common fast growing tree, typical of dry soils.
<i>Aschranthes aspera</i>	Burr	Invasive herbaceous species, present as a result of soil disturbances.
<i>Bauhinia thonningii</i>	Camelfoot tree	Common tree, typical of dry conditions.
<i>Sterculia quinqueloba</i>	Large-leaved star chestnut	Tree, typical of open woodland.
<i>Sida acuta</i>	Wireween	Weed annual plant, present as a result of soil disturbances.
<i>Ximenia americana</i>	Wild plum	Fast growing tree fruit, typical of dry conditions.
<i>Cissus buchannii</i>	Mwanmphepo	Annual herb, typical of dry conditions.
<i>Tridax procumbens</i>	Tridax daisy	Annual weed, present due to soil disturbances.
<i>Crinum macowanii</i>	Spider lily	Annual herb, typical of moist conditions.
<i>Chrysopogon zizanioides</i>	Vetivar grass	Introduced grass, typical of moist conditions.

(b) Threatened and Endemic Species

Two threatened species of flora presented in Table 1-4 were identified on the outskirts of the project site. No endemic flora species was recorded from the project site during the field work.

Table 1-4: Threatened Species of Flora Recorded from Habitat 1 of the Project Site

Species Name	Local Name	National Red List	IUCN Red List
<i>Pterocarpus angolensis</i>	African teak tree or Mlombwa	Vulnerable (VU)	Near-threatened (NT)
<i>Dalbergia melanoxylon</i>	African blackwood or Mphingo	Endangered (EN)	Near-threatened (NT)

(c) *Tree Density*

The estimate showed that the tree density of the project site was about 10 mature individual stems per hectare. This indicates that the plant biomass to be lost during the construction of the Solar Power Plant would be negligible and this cannot substantially contribute to local climate change of the area.

(d) *Alien Invasive Species*

One alien invasive species of flora namely; *Gmelina arborea* was recorded from the project site during the field survey. There were other flora species such as *Moringa oleifera* and *Melia azedarach* that are alien to the project site but their potential to be invasive has not yet been established.

1.3.1.4 Ecosystem Services at Habitat 1

Ecosystem Services are the benefits people derive from ecosystems. Besides provisioning services or goods like food, wood and other raw materials, plants, animals, fungi and micro-organisms provide essential regulating services such as pollinating crops, prevention of soil erosion and water purification, and a vast array of cultural services, like creation and a sense of place (Millennium Ecosystem Assessment, 2016).

During the field survey, various ecosystem services belonging to different categories were reported by communities and also observed by the project team. Table 1-5 presents some of the ecosystem that were present or do occur at habitat 1 of the project site.

Table 1-5: Ecosystem Services Offered and/or Found at Habitat 1

ECOSYSTEM SERVICE	EXPLANATION
PROVISIONING ECOSYSTEM SERVICES	
Food crops	There are a number of cultivated food crops such as maize, groundnuts, soya bean, cucumber, water melon, sorghum, cassava and cow peas that are grown on the project site between December and May each year. These food crops are harvested by subsistence farmers for consumption and income.
Wild plant fruits	The project site is also a home to some wild plant fruits such as <i>Vitex mombasa</i> , cucumber and <i>Ximenia americana</i> which are harvested by communities living around for food.
Livestock grazing land	The seasonal valleyhead wetland is used for livestock (cattle and goats) grazing. It was reported by communities that the project site support over 80 livestock that feed on grasses found on this seasonal wetland.
Bush meat	Wild animals that are hunted on the project site for bush meat include mice, hare and birds. These animals are source of proteins to communities.
Fuelwood	Some trees especially the exotic species are harvested for fuelwood for cooking.
Thatch grass	The project site has some thatch that communities harvest for thatching their houses and for sale.
Natural medicine	Some species of flora found on the project site are harvested by communities to be used in traditional medicine which cure various illnesses.
REGULATING ECOSYSTEMS	
Regulation of water flows	The wetland grasses and sedges found on the western part of the project site are important in prevention of floods.
Soil erosion control	The project site has grasses and which are important in prevention of floods.
Regulation of soil quality	Tree species such as <i>Faidherbia albida</i> are kept by farmers a source of nitrogen in the soil. It was estimated that the project site has over 70 mature

	individual species of <i>Faidherbia albida</i> .
Pollination of crops	The project site a good number of insects such as butterflies, which pollinate agricultural crops on the project site
CULTURAL ECOSYSTEM SERRVICES	
Ethical values	The project site has some trees such as <i>Faidherbia albida</i> which ethically influence peoples' desire to protect them as they fix nitrogen in the soil.
SUPPORTING ECOSYSTEM SERVICE	
Biodiversity maintenance	The project site has the potential to support biodiversity such as trees, insects and birds.
Primary Production	The project site maintains formation of biological materials through photosynthesis and nutrient assimilation

1.3.1.5 Prioritization of Ecosystem Services

Ecosystem Services (ES) that were assessed at habitat 1 of the project site and also prioritized using the logical framework adapted from WRI are presented in Table 1-6.

Table 1-6: Prioritization of Ecosystem Services Found at Habitat 1

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
PROVISIONING ECOSYSTEM SERVICE				
Crops cultivated at the project site are source of food and income	Yes, the project will have impact on peoples' livelihoods due to turning of agricultural into industrial land	The crops cultivated such as <i>Zea mays</i> , <i>sorghum bicolor</i> , <i>Sorghum dochna</i> , <i>Arachis hypogaea</i> , <i>Gossypium arboretum</i> etc are sources of food and income to farmers	Yes, some crops of similar varieties are found elsewhere and can be cultivated elsewhere if another piece of land is bought for displaced farmers	Non-priority ES
Wild plant fruits	Yes, the project will have impact on peoples' livelihoods due to turning of agricultural into industrial land	Wild plant fruits such as <i>Ximenia Americana</i> , <i>Vitex mombasae</i> found at the project site are source of food to communities around	Yes, the wild plant fruits can planted elsewhere and are also commonly found in other farmlands and bush areas	Non-priority ES
Livestock grazing land	No, the project will not have negative impact on livestock	There is another large seasonal wetland downstream of the project site	Another seasonal wetland is available in the project area where livestock can continue grazing	Non-priority ES
Bush meat	Yes, the project will somehow have	The birds, mice and grasshoppers found	Yes, the birds, mice and grasshoppers	Non-priority ES

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
	impact on peoples' lives as the project site is source of bush meat.	at the project site are also found in other areas around this project site	can migrate to adjacent areas where they can seek refuge during the construction	
Fuelwood	No, the project will not contribute to the impact on scarcity of fuelwood in the area	Yes, the fuelwood of the project is important to the communities, especially old women and young girls from surrounding villages.	There are plenty of trees in adjacent areas of the project site and more trees for fuelwood can be planted at households.	Non-priority ES
Thatch grass	Yes, clearing of grass such as <i>Hyparrhenia filipedula</i> , <i>Heteropogon contortus</i> , <i>Melinis repens</i> to pay way for the construction of the project will have impact on people	Grass is used for thatching houses and livestock houses but is also sold for income by villagers	Yes, the thatch grass is also found on other customary lands found in the project area and can be alternative source	Non-priority ES
Natural medicine	Yes, the project will have impact on people due to loss of some medicinal plants	Medicinal plants are used to treat various illnesses at local level	Yes, the medicinal plant species found on the project site are also found in other agricultural and woodlands found in the area	Non-priority ES
REGULATING ECOSYSTEM SERVICE				
Regulation of water flows	Yes, the project will have impact on regulation of water flows especially during rainy season due to clearing of the seasonal wetland	The seasonal wetland grasses such <i>Urochloa mosambicensis</i> , <i>Leersia hexandra</i> etc. regulate flow of water so that the water is not flooding which can be detrimental to lives of people and livestock	No, it is not possible to replace it.	Priority ES
Soil erosion control	Yes, clearing of grasses on the	Clearing of grasses from the project site	Yes, it is possible to replace the loss of	Non-priority ES

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
	project site will have impact on soil erosion	will not be of any benefit to farmers as fertile soil will get lost	grasses through planting	
Regulating of soil quality	Yes, cutting down of plants on the project site will have impact on quality of soil	Clearing of plants from the project site will affect the quality of soil on the project site and beyond	Yes, it is possible to replace plants to be cut down by planting them in adjacent areas	Non-priority ES
Pollination of crops	Yes, clearing of the project site will have impact on pollinating insects such as butterflies, bees	Pollinating insects are important for production and productivity of crops	Yes, it is possible to replace plants which are homes to insects to be lost during the construction by planting	Non-priority ES
CULTURAL ECOSYSTEM SERVICES				
Ethical values	Yes, the project will have impact on ethical values of communities	Clearing of plants such as <i>Faidherbia albida</i> and other trees that farmers protect because of their social value will have impact on ethical values of the people	Yes, it is possible to replace them and a lot of similar species are found on cultivated farmlands in the district	Non-priority ES

1.3.1.6 CLASSIFICATION AND SENSITIVITY OF HABITAT 1 OF THE PROJECT SITE

The continuous cultivation of the proposed project site by subsistence farmers for agriculture has led to the:

- presence of moderate diversity of taxa(plants and/or animals) relative to diversity expected under natural conditions;
- moderate numbers of sensitive taxa such as *Pterocarpus anglensis*, *Dalbergia melanoxylon*; and
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions, and;
- presence of alien invasive species such as *Gmelina arborea* including other alien species e.g. *Moringa oleifera*, *Melia azedarach* and *Senna obtusifolia* – these are non-native origin plant species that have been introduced on the project site by communities for timber, fuelwood and/or fruits.

Based on the above attributes, the Project Site is conclusively classified as **Modified Habitat**, although it has potential to support species of biodiversity (fauna and flora).

1.3.2 Habitat 2

1.3.2.1 An Overview of Habitat 2 of the Project Site

The habitat is generally a flood plain seasonal valleyhead wetland which is used for grazing livestock such as cattle and goats (Fig. 1-5). The seasonal valleyhead wetland is part of the project site and is located on the western side of this site. The site is colonised by seasonal wetland grasses such as *Leersia hexandra* and *Urochloa mossambicensis* among others. There are also scattered shrubby trees on the site and the dominant species are *Combretum* spp. These grasses are also ecologically important as they regulate floods in the area.



Figure 1-5: Part of the Seasonal Valleyhead Wetland of the Project Site

1.3.2.2 Fauna

Birds

(a) Species Composition

A total of three (3) terrestrial and one (1) water bird species were recorded from the habitat 2 of the project site during the field survey. Species recorded from this project site are indicated in Table 1-7.

Table 1-1: Bird Species Identified on the Habitat 2

Species Name	Local Name	Comment
<i>Myioparus griseigularis</i>	Grey-throated Tit-Flycatcher	Common resident bird and
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Bubulcus ibis</i>	Cattle Egret	Common waterbird

(b) Threatened and Endemic Species

No threatened species or endemic species was recorded from the habitat 2 during the field work. All species listed above have a conservation status of Least Concern (LC), which entails that they are not at the verge of threatened in their habitats or in the region.

(c) Alien Species

No alien species of birds were recorded from or observed in the project site during the field survey.

Mammals

Non-indigenous mammal species were recorded from the project site. However, only two reared mammal species which are taken to the site for grazing by local communities were observed and recorded during the field survey. These mammal species, presented in Table 1-8, were recorded from the seasonal valleyhead wetland on the western side, which is part of the project site.

Table 1-8: Small Mammal Species Recorded from the Habitat 2

Species Name	Local Name	Comment
<i>Bos taurus</i>	Cattle	Common reared mammal species in the project area
<i>Capra aegagrus hircus</i>	Goat	Common reared mammal species in the project area

(b) Threatened and Endemic Species

No threatened species or endemic species of mammal were recorded from the habitat 2 during the field work.

(c) Alien Species

No alien species of mammal was observed by the project team or reported to occur in habitat 2 by the communities.

1.3.2.3 Flora

(a) Species Composition

There were five (5) wetland flora species that were recorded from this habitat during the field survey. These species are presented in Table 1-9.

Table 1-9: Flora Species Identified on the Project Site

Species Name	Local Name	Comment
<i>Leersia hexandra</i>	Club head cutgrass	Common tree typical of seasonal wetlands.

Species Name	Local Name	Comment
<i>Cyperus laevigatus</i>	Smooth sedge grass	Common grass, typically seasonal wetlands
<i>Scirpus littoralis</i>	Bulrush	Common grass, typically seasonal wetlands
<i>Sporobolus consimilis</i>	Drop-seed grass	Common grass, typical of seasonal wetland characterising alkaline conditions.
<i>Urochloa mosambicensis</i>	Signalgrass	Grass, typical of dry conditions and seasonal wetlands

(b) Threatened and Endemic Species

. No threatened or endemic wetland flora species was recorded from this habitat during the field work.

(d) Alien Invasive Species

No alien invasive wetland flora species was recorded from the habitat type during the field survey.

1.3.2.4 Ecosystem Services Found and/or Offered at Habitat 2

During the field survey, various ecosystem services belonging to different categories were observed and some reported by communities. Table 1-10 present some of the ecosystem services belonging to different categories that project site, including the transmission line offer to the communities living around.

Table 1-10: Ecosystem Services Offered by Habitat 2

ECOSYSTEM SERVICE	EXPLANATION
PROVISIONING ECOSYSTEM SERVICES	
Livestock grazing land	The seasonal valleyhead wetland is used for livestock (cattle and goats) grazing. It was reported by communities that the project site support over 80 livestock that feed on grasses found on this seasonal wetland.
Bush meat	Wild animals that are hunted on the project site for bush meat include mice, hare and birds. These animals are source of proteins to communities.
Natural medicine	Some species of flora found on the project site are harvested by communities to be used in traditional medicine which cure various illnesses.
REGULATING ECOSYSTEMS	
Regulation of water flows	The wetland grasses and sedges found on the western part of the project site are important in prevention of floods.
Soil erosion control	The project site has grasses and which are important in prevention of floods.
Regulation of soil quality	Grass species such as <i>Urochloa mosambicensis</i> and other species regulate soil quality of the habitat.
Pollination of crops	The project habitat is home to number of insects such as butterflies and grasshoppers which pollinate agricultural crops on the project site.
SUPPORTING ECOSYSTEM SERVICE	
Biodiversity maintenance	The project site has the potential to support biodiversity such as trees, insects and birds.
Primary Production	The project site maintains formation of biological materials through photosynthesis and nutrient assimilation

1.3.2.5 Prioritization of Ecosystem Services

Ecosystem Services (ES) that were assessed at habitat 2 were also prioritized using the logical framework adapted from WRI as presented in Table 1-11.

Table 1-11: Prioritization of Ecosystem Services of the Habitat 2

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
PROVISIONING ECOSYSTEM SERVICE				
Livestock grazing land	No, the project will not have negative impact on livestock	There is another large seasonal wetland downstream of the project site	Another seasonal wetland is available in the project area where livestock can continue grazing	Non-priority ES
Bush meat	Yes, the project will somehow have impact on peoples' lives as the project site is source of bush meat.	The birds, mice and grasshoppers found at the project site are also found in other areas around this project site	Yes, the birds, mice and grasshoppers can migrate to adjacent areas where they can seek refuge during the construction	Non-priority ES
Natural medicine	Yes, the project will have impact on people due to loss of some medicinal plants	Medicinal plants are used to treat various illnesses at local level	Yes, the medicinal plant species found on the project site are also found in other agricultural and woodlands found in the area	Non-priority ES
REGULATING ECOSYSTEM SERVICE				
Regulation of water flows	Yes, the project will have impact on regulation of water flows especially during rainy season due to clearing of the seasonal wetland	The seasonal wetland regulates flow of water so that the water is not flooding which can be detrimental to lives of people and livestock	No, it is not possible to replace it.	Priority ES
Soil erosion control	Yes, clearing of grasses on the project site will have impact on soil erosion	Clearing of grasses from the project site will not be of any benefit to farmers as fertile soil will get lost	Yes, it is possible to replace the loss of grasses through planting	Non-priority ES
Regulating of soil quality	Yes, cutting down of plants on the project site will have impact	Clearing of plants from the project site will affect the quality	Yes, it is possible to replace plants to be cut down by planting	Non-priority ES

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
	on quality of soil	of soil on the project site and beyond	them in adjacent areas	
Pollination of crops	Yes, clearing of the project site will have impact on pollinating insects such as butterflies, bees	Pollinating insects are important for production and productivity of crops	Yes, it is possible to replace plants which are homes to insects to be lost during the construction by planting	Non-priority ES

1.3.2.6 CLASSIFICATION AND SENSITIVITY OF HABITAT 2 OF THE PROJECT SITE

Continuous livestock grazing on this habitat by local communities in the project area has led to

- presence of moderate diversity of taxa(plants and/or animals) relative to diversity expected under natural conditions;
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions, and;
- alien species may be present as a result of habitat disturbances.

Therefore, this type of habitat can be classified as *Moderately Modified*, although it has potential to support species of biodiversity (fauna and flora).

1.4 TRANSMISSION LINE

1.4.1 Habitat 1

1.4.1.1 An Overview of Habitat 1 of the Transmission Line

The habitat of the proposed transmission line is generally flat land and is predominantly used for subsistence agriculture (fig 1-6). Crops cultivated on the project site include maize, cotton, sorghum, pumpkins, groundnuts, beans, soya and cow peas among others. Trees that were found along this transmission line include natural and planted; and fruit trees such as mangoes.

1.4.1.2 Fauna

Birds

(a) Species Composition

A total of seven (7) terrestrial and resident bird species were recorded from the habitat of the transmission line. Species recorded are presented in table 1-12.

Table 1-12: Bird Species Identified from the Transmission Line

Species Name	Local Name	Comment
<i>Pyconotus barbatus</i>	Common Bulbul	Common resident bird
<i>Merops pusillus</i>	Little Bee-eater	Common resident bird
<i>Streptopelia semiforquata</i>	Cape Turtle Dove	Resident bird
<i>Tauraco corythaix</i>	Kynsna Lourie	Rare bird
<i>Crithagra striolata</i>	Streaky Seedeater	Common resident bird
<i>Euplectes intermedius</i>	Yellow-crowned Bishop	Common resident bird
<i>Eucleptes psammocromius</i>	Mountain marsh Widowbird	Rare bird
<i>Cyanomitra verticalis</i>	Green headed Sunbird	Common resident bird

(b) Threatened and Endemic Species

Neither threatened nor endemic species of bird was recorded from the habitat of the transmission line during the field work. All species listed above have a conservation status of Least Concern (LC), which entails that they are not at the verge of threatened in their habitat or in the region.

(c) Alien Species

No alien species of birds were recorded or observed from the transmission line in the habitat of during the field survey.



Figure 1-12: Photo Showing the view of the Habitat of the Proposed Transmission Line

Mammals

Both large and small mammal species were not observed on the habitat during the field survey. Due to the continued

subsistence agriculture which has been taking place on the habitat of the project site, it was not expected to encounter any large mammal species. It is, however, expected that the project site may harbour species of small mammals such as rodents, mice and common African Hare. Spoor of hare were observed in the habitat during the survey, which indicate that small mammals do occur in the project site.

(a) Species Composition

During the consultation with some local communities and physical observation of spoor for the hare, it was established that four (4) species of small mammals do occur along the habitat of the transmission line. The species are presented in Table 1-13.

Table 1-13: Small Mammal Species Reported along the Transmission Line

Species Name	Local Name	Comment
<i>Lophuromys flavopunctatus</i>	Rodent	Common resident mammal in cultivated lands
<i>Mus</i> spp.	Mice	Common resident mammal in cultivated lands
<i>Lepus microtis</i>	African Hare	Rare
<i>Epomophorus wahlbergi</i>	Fruit bat	Rare

(b) Threatened and Endemic Species

No threatened or endemic species of mammal were recorded from the Transmission Line during the field work. The conservation status of *Lepus microtis* and *Epomophorus wahlbergi* is classified as Least Concern (LC) while other remaining species are not threatened.

(c) Alien Species

No alien species of mammal was observed by the project team or reported to occur at the proposed project site by the communities.

1.4.1.3 Flora

Most of the project site has been cultivated with dryland crops such as *Zea mays* (Corn Maize), *Sorghum dochna* (Millet), *Sorghum bicolor* (Sorghum), *Arachis hypogaea* (Groundnuts), *Gossypium arboreum* (Cotton), *Cucumis anguria* (Maroon Cucumber), *Citrullus lanatus* (Water Melon), *Mandifera indica* (Mango), *Glycine max* (Soya bean), *Ipomoea batatas* (Sweet Potato), *Cucumis melo* (Cucumber), and *Phaseolus vulgaris* (Common bean). The project site also has a good number of both indigenous and planted plant species, including fruit trees. Flora species were also recorded from the project site during the field survey.

(a) Species Composition

A total of sixty-seven (67) terrestrial flora species were recorded from the project site. These species are presented in Table 1-14. The most common species were *Faidherbia albida* (Msangu) and *Combretum* spp. (mswaswa).

Table 1-14: Flora Species Identified From the Proposed Transmission Line

Species Name	Local Name	Comment
<i>Faidherbia albida</i>	(Msangu) or Ana tree	Common tree typical of riparian habitat. Seed pods are eaten by

Species Name	Local Name	Comment
		livestock and the tree fix nitrogen in the soil.
<i>Pennisetum polystachion</i>	Udzu or Mission grass	Common grass, typically occurring in disturbed land and is invasive in some cases.
<i>Roettbolia cochinchinensis</i>	Udzu (Itch grass)	Common grass, typically occurring in disturbed land and is invasive in some cases.
<i>Acacia polystachya</i>	Black Wattle	Invasive plant species. Plant is used as feed for livestock
<i>Senna obtusifolia</i>	Sickle Senna	Alien tree, typically introduced by communities on farmlands.
<i>Vernonia glabra</i>	Cornflower	An annual herb, typical of secondary woodland
<i>Trichodesma zeylanicum</i>	Camel bush	Annual herb, typical of secondary woodland
<i>Philenoptera violacea</i>	Apple-leaf	Common tree, typical of dry Miombo woodland
<i>Melinis repens</i>	Natal grass	Perennial grass, typical of dryland and used for thatching houses
<i>Vernonia poskeana</i>	Sandveld vernonia	Annual herb, typical of secondary woodland
<i>Stereospermum kunthianum</i>	Zana	Small tree occurring in open woodland
<i>Crotalia virgata</i>	Rattlepod	Small annual herb, typical of open woodland and cultivated land.
<i>Corchorus olitorius</i>	Bush Okra	Small annual herb, typical of open cultivated land.
<i>Ceratotheca sesamoides</i>	Sesame	Wild weed and locally grows in cultivated land
<i>Merremia pinnata</i>	Kosrae	Common annual climber
<i>Siphonochilus aethiopicus</i>	Wild ginger	Annual herb, typical of cultivated land
<i>Albizia harveyi</i>	Sickle-leaved Albizia	Tree, typical of open woodland
<i>Leucas amartinicensis</i>	Whitewort	Annual herb, typical of cultivated land
<i>Panicum maximum</i>	Guinea grass	Grass, typical of cultivated and open woodland
<i>Cucumis sativus</i>	Cucumber	Cultivated fruit
<i>Hibiscus subdariffa</i>	Roselle	Annual woody-based Okra, used for making tonic drink
<i>Holarhena pubescens</i>	Kurchi	Annual tree, typical of open woodland
<i>Sclerocarya birrea</i>	Marula tree	Tree, typical of open secondary or primary forest
<i>Strychnos spinosa</i>	Green monkey orange	Shrub,
<i>Hackelochloa granularis</i>	Pit-scale Grass	Annual grass, typical of cultivated land
<i>Blepharis taitensis</i>	Creeping Blepharis	Annual herb, grows in cultivated land.
<i>Sorghum bicolor</i>	Sorghum	Perennial grass usually cultivated
<i>Pennisetum glaucum</i>	Millet	Annual grass usually cultivated.

Species Name	Local Name	Comment
<i>Codyla africana</i>	Wild Mango	Tree, typical of primary or secondary woodland
<i>Andropogon shirensis</i>	Beard Grass	Annual grass , typical of cultivated land
<i>Senna spectabilis</i>	Whitebark senna	Tree, introduced in cultivated land by humans
<i>Hyparrhenia filipendula</i>	Fine-hood Grass	Grass, typical of disturbed land used for thatching.
<i>Digitaria milanjana</i>	Crabgrass	Grass, typical of disturbed land.
<i>Acacia sieberiana</i>	Paperbark acacia	Tree, typical of open woodland
<i>Heteropogon contortus</i>	Black spear grass	Perennial grass, typical of disturbed land.
<i>Lannea stuhlmanniana</i>	False marula	Tree, typical of closed woodland.
<i>Markhamia obtusifolia</i>	Golden bell-bean	Tree, typical of closed woodland.
<i>Combretum collinum</i>	Bushwill tree	Common fast growing shrubby tree, typical closed or open woodland
<i>Philenoptera bussei</i>	Narrow-lance pod	Common tree, typical of open woodland
<i>Vitex mombasae</i>	Chaste tree	Small tree, typical of open woodland and its fruits are edible
<i>Xeroderis stuhlmanii</i>	-	Common fast growing thorny tree, typical of open thicket woodland
<i>Ocimum americanum</i>	Hoary Basil	Fast growing annual herb plant, typical of moist conditions
<i>Combretum zeyheri</i>	Bushwill sp.	Common fast growing shrubby tree species, typical of open woodland
<i>Melia azedarach</i>	Indian lilac tree	Common fast growing tree, growing disturbed land.
<i>Hibiscus esculentus</i>	Lady's fingers Okra	Annual herb, cultivated plant and is edible as relish
<i>Gmelina arborea</i>	Gmelina	Invasive tree species, planted on land as source of firewood.
<i>Bidens pilosa</i>	Black jack	Introduced weed annual herb, present as a result of soil disturbances
<i>Sorghum verticilliflorum</i>	Broomcorn	Grass, cultivated on land for food.
<i>Piliostigma thonningii</i>	Monkey bread	Slow growing tree, typical of closed woodland.
<i>Bobgunia madagascariensis</i>	Snake bean tree	Fast growing tree, typical of moist condition.
<i>Adansonia digitata</i>	Baobaba tree	Common tree, typical of dry soils and hot areas. Leaf and seedpods are eaten by people as vegetable and fruits respectively.
<i>Cassia abbreviata</i>	Long-tail cassia	Fast growing tree, typical of open woodland.
<i>Dalbergia melanoxylon</i>	African black wood	Slow growing tree, typical of dry soils
<i>Combretum elaegmoides</i>	Oleaster bushwill	Common fast growing shrubby tree, typical of moist conditions.
<i>Pterocarpus angolensis</i>	African teak tree	Common fast growing tree, typical of dry soils.
<i>Aschranthes aspera</i>	Burr	Invasive herbaceous species,

Species Name	Local Name	Comment
		present as a result of soil disturbances.
<i>Bauhinia thonningii</i>	Camelfoot tree	Common tree, typical of dry conditions.
<i>Sterculia quinqueloba</i>	Large-leaved star chestnut	Tree, typical of open woodland.
<i>Sida acuta</i>	Wireween	Weed annual plant, present as a result of soil disturbances.
<i>Ximenia americana</i>	Wild plum	Fast growing tree fruit, typical of dry conditions.
<i>Cissus buchannii</i>	Mwanmphepo	Annual herb, typical of dry conditions.
<i>Tridax procumbens</i>	Tridax daisy	Annual weed, present due to soil disturbances.
<i>Crinum macowanii</i>	Spider lily	Annual herb, typical of moist conditions.
<i>Chrysopogon zizanioides</i>	Vetivar grass	Introduced grass, typical of moist conditions.
<i>Lonchorchopus capassa</i>	Apple-leaf	Tree, typical of dry soils
<i>Annona senegalensis</i>	Wild custard-apple	Fruit shrubby tree, typical of open woodland
<i>Eucalyptus globulus</i>	Bluegum	Fast growing exotic tree, typical of dry conditions.

(b) Threatened and Endemic Species

Two threatened species of flora presented in table 1-4 were identified on the outskirts of the project site. No endemic flora species was recorded from the project site during the field work.

Table 1-4: Threatened Flora Species Recorded from the Proposed Transmission Line

Species Name	Local Name	National Red List	IUCN Red List
<i>Pterocarpus angolensis</i>	African teak tree or Mlombwa	Vulnerable (VU)	Near-threatened (NT)
<i>Dalbergia melanoxylon</i>	African Blackwood or Mphingo	Endangered (EN)	Near-threatened (NT)

(c) Tree Density

The estimate showed that the tree density of the transmission line was about 8 mature individual stems per hectare. This indicates that the plant biomass to be lost during the construction of the Solar Power Plant would be negligible and this cannot substantially contribute to local climate change of the area.

(d) Alien Invasive Species

Two alien invasive species of flora namely; *Gmelina arborea* and *Eucalyptus globules* were recorded from the proposed transmission line during the field survey. There were other flora species such as *Moringa oleifera* and *Melia azedarach* that are alien to the proposed transmission line but their potential to be invasive has not yet been established.

1.4.1.4 Ecosystem Services at Habitat 1

During the field survey, various ecosystem services belonging to different categories were reported by communities but also observed by the project team. Table 1-15 presents some of the ecosystem services belonging to different categories that were found along the transmission line.

Table 1-15: Ecosystem Services Offered and/or Found at Habitat 1 of the Transmission Line

ECOSYSTEM SERVICE	EXPLANATION
PROVISIONING ECOSYSTEM SERVICES	
Food crops	There are a number of cultivated food crops such as maize, groundnuts, soya bean, cucumber, water melon, sorghum, cassava and cow peas that are grown on the project site between December and May each year. These food crops are harvested by subsistence farmers for consumption and income.
Wild plant fruits	The project site is also a home to some wild plant fruits such as <i>Vitex mombasae</i> , cucumber and <i>Ximenia americana</i> which are harvested by communities living around for food.
Livestock grazing land	The seasonal valleyhead wetland is used for livestock (cattle and goats) grazing. It was reported by communities that the project site support over 80 livestock that feed on grasses found on this seasonal wetland.
Bush meat	Wild animals that are hunted on the project site for bush meat include mice, hare and birds. These animals are source of proteins to communities.
Fuelwood	Some trees especially the exotic species are harvested for fuelwood for cooking.
Thatch grass	The project site has some thatch that communities harvest for thatching their houses and for sale.
Natural medicine	Some species of flora found on the project site are harvested by communities to be used in traditional medicine which cure various illnesses.
REGULATING ECOSYSTEMS	
Regulation of water flows	The wetland grasses and sedges found on the western part of the project site are important in prevention of floods.
Soil erosion control	The project site has grasses and which are are important in prevention of floods.
Regulation of soil quality	Tree species such as <i>Faidherbia albida</i> are kept by farmers a source of nitrogen in the soil. It was estimated that the project site has over 70 mature individual species of <i>Faidherbia albida</i> .
Pollination of crops	The project site a good number of insects such as butterflies, which pollinate agricultural crops on the project site
CULTURAL ECOSYSTEM SERRVICES	
Ethical values	The project site has some trees such as <i>Faidherbia albida</i> which ethically influence peoples' desire to protect them as they fix nitrogen in the soil.
SUPPORTING ECOSYSTEM SERVICE	
Biodiversity maintenance	The project site has the potential to support biodiversity such as trees, insects and birds.
Primary Production	The project site maintains formation of biological materials through photosynthesis and nutrient assimilation

1.4.1.5 Prioritization of Ecosystem Services of the Transmission Line

Ecosystem Services (ES) that were assessed from the transmission line and were also prioritized using the logical framework adapted from WRI as presented in table 1-16.

Table 1-16: Prioritization of Ecosystem Services From the Proposed Transmission Line

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
PROVISIONING ECOSYSTEM SERVICE				
Crops cultivated at the project site are source of food and income	Yes, the project will have impact on peoples' livelihoods due to turning of agricultural into industrial land	The crops cultivated such as <i>Zea mays</i> , <i>sorghum bicolor</i> , <i>Sorghum dochna</i> , <i>Arachis hypogaea</i> , <i>Gossypium arboretum</i> etc are sources of food and income to farmers	Yes, some crops of similar varieties are found elsewhere and can be cultivated elsewhere if another piece of land is bought for displaced farmers	Non-priority ES
Wild plant fruits	Yes, the project will have impact on peoples' livelihoods due to turning of agricultural into industrial land	Wild plant fruits such as <i>Ximenia Americana</i> , <i>Vitex mombasae</i> found at the project site are source of food to communities around	Yes, the wild plant fruits can planted elsewhere and are also commonly found in other farmlands and bush areas	Non-priority ES
Livestock grazing land	No, the project will not have negative impact on livestock	There is another large seasonal wetland downstream of the project site	Another seasonal wetland is available in the project area where livestock can continue grazing	Non-priority ES
Bush meat	Yes, the project will somehow have impact on peoples' lives as the project site is source of bush meat.	The birds, mice and grasshoppers found at the project site are also found in other areas around this project site	Yes, the birds, mice and grasshoppers can migrate to adjacent areas where they can seek refuge during the construction	Non-priority ES
Fuelwood	No, the project will not contribute to the impact on scarcity of fuelwood in the area	Yes, the fuelwood of the project is important to the communities, especially old women and young girls from surrounding villages.	There are plenty of trees in adjacent areas of the project site and more trees for fuelwood can be planted at households.	Non-priority ES
Thatch grass	Yes, clearing of grass such as	Grass is used for thatching houses	Yes, the thatch grass is also found on	Non-priority ES

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
	<i>Hyparrhenia filipedula</i> , <i>Heteropogon contortus</i> , <i>Melinis repens</i> to pay way for the construction of the project will have impact on people	and livestock houses but is also sold for income by villagers	other customary lands found in the project area and can be alternative source	
Natural medicine	Yes, the project will have impact on people due to loss of some medicinal plants	Medicinal plants are used to treat various illnesses at local level	Yes, the medicinal plant species found on the project site are also found in other agricultural and woodlands found in the area	Non-priority ES
REGULATING ECOSYSTEM SERVICE				
Regulation of water flows	Yes, the project will have impact on regulation of water flows especially during rainy season due to clearing of the seasonal wetland	The seasonal wetland grasses such <i>Urochloa mosambicensis</i> , <i>Leersia hexandra</i> etc. regulate flow of water so that the water is not flooding which can be detrimental to lives of people and livestock	No, it is not possible to replace it.	Priority ES
Soil erosion control	Yes, clearing of grasses on the project site will have impact on soil erosion	Clearing of grasses from the project site will not be of any benefit to farmers as fertile soil will get lost	Yes, it is possible to replace the loss of grasses through planting	Non-priority ES
Regulating of soil quality	Yes, cutting down of plants on the project site will have impact on quality of soil	Clearing of plants from the project site will affect the quality of soil on the project site and beyond	Yes, it is possible to replace plants to be cut down by planting them in adjacent areas	Non-priority ES
Pollination of crops	Yes, clearing of the project site will have impact on pollinating insects such as butterflies, bees	Pollinating insects are important for production and productivity of crops	Yes, it is possible to replace plants which are homes to insects to be lost during the construction by planting	Non-priority ES

Description of ES	Likely Impact	Importance to Beneficiaries	Replaceability	Prioritisation Result
Brief description of important attributes	Yes/No: Explanation of why ES will/will not be impacted	Yes/No: Explanation of why ES is/is not important	Yes/No: Explanation of availability/non-availability elsewhere	Priority/Non priority ES to the people/ecosystem
CULTURAL ECOSYSTEM SERVICES				
Ethical values	Yes, the project will have impact on ethical values of communities	Clearing of plants such as <i>Faidherbia albida</i> and other trees that farmers protect because of their social value will have impact on ethical values of the people	Yes, it is possible to replace them and a lot of similar species are found on cultivated farmlands in the district	Non-priority ES

1.4.1.6 CLASSIFICATION AND SENSITIVITY OF HABITAT 1 OF THE TRANSMISSION LINE

The continuous cultivation of the proposed project site by subsistence farmers for agriculture has led to the:

- presence of moderate diversity of taxa(plants and/or animals) relative to diversity expected under natural conditions;
- moderate numbers of sensitive taxa such as *Pterocarpus angolensis*, *Dalbergia melanoxylon*, and
- moderate reduction in abundance of some or all taxa relative to that expected under natural conditions, and;
- presence of alien invasive species such as *Gmelina arborea* and *Eucalyptus globulus* including other alien species e.g. *Moringa oleifera*, *Melia azedarach* and *Senna obtusifolia* – these are non-native origin plant species that have been introduced on the project site by communities for timber, fuelwood and/or fruits.

Based on the above attributes, the Project Site is conclusively classified as *Modified Habitat*, although it has potential to support species of biodiversity (fauna and flora).

2. ASSESSMENT OF ENVIRONMENTAL IMPACTS ON BIODIVERSITY

2.1 METHODOLOGY FOR IMPACT ASSESSMENT AND IDENTIFICATION

An “environmental matrix” was used to identify the potential environmental impacts on biodiversity. Potential sources of impacts from the project activities during planning and design, construction and operation were identified with reference to the biological components to be impacted. The impacts presented in subsequent sections were determined basing on the following information:

- Technical aspects of the project: This enabled the identification of potential sources of impacts, based on the analysis of the technical characteristics of the infrastructures to be built, as well as the construction activities, methods and schedule.
- Environmental and socio-economic baseline data (environmental and social components): This information facilitated understanding of the biophysical, social and economic contexts in which the project will be

implemented and identification of issues that should be considered. The environmental and social components; and

- Issues and concerns raised by relevant stakeholders and project affected persons: These issues, from stakeholder consultations, assisted in identification of the main concerns related to the project.

2.1.1 Analysis of Potential Beneficial Impacts

(a) **Planting of trees to offset the cleared ones:** For every one tree to be cut down during the construction of the project, five trees of same indigenous species have to be planted in the vicinity and/or in places earmarked for village forests. It is estimated that on average, 1680 trees will be cut down from the project site during the construction and it is expected that over 8500 indigenous trees, principally *Faidherbia albida*, *Pterocarpus angolensis* and *Khaya anthotheca* will be planted in the vicinity of the project site to offset the loss.

Enhancement measures:

- Plant fast growing indigenous tree species which are site adaptive;
- Manage the planted tree seedlings up to reasonable maturity size; and
- Train Village Natural Resources Management Committees in seedlings management.

2.1.2 Analysis of Potential Negative Impacts

(a) **Loss or destruction of habitats for fauna and flora:** Clearing of vegetation for construction of the solar power plant, access and service roads is likely to result in destruction of habitats for fauna and flora. Excavation and compaction of soils may result in loss of habitats for species of mammals, reptiles and amphibians. This may eventually compromise survival of soil-based micro and macro organisms.

Mitigation measures:

- i. Ensure that vegetation is selectively cleared from the project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation;
- ii. Rehabilitate affected land by tilling the soils to facilitate natural regeneration of vegetation from saplings and soil seed banks;
- iii. Plant indigenous site adaptive tree seedlings and grass immediately after construction works to ensure restoration of lost flora; and
- iv. Ensure that seasonal wetland grasses that are found on the western part of the project site are not completely cleared away.

(b) **Loss of threatened flora and vegetation:** Clearing of vegetation for construction of the solar power plant, access and service roads is likely to result in loss of threatened species (*Pterocarpus angolensis* and *Dalbergia melanoxylon*) that occur on the project site and along the transmission line. This may eventually contribute to the significant reduction of the population size of these species, which are already at the verge of extinction.

Mitigation measures:

- i. Avoid cutting down of these few threatened flora species from the project site;
- ii. For every tree to be cut of this species, plant five individual seedlings of the same species;
- iii. Ensure management of planted seedlings until the trees are mature.
- iv. Ensure that vegetation is selectively cleared from the project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation;
- v. Rehabilitate affected land by tilling the soils to facilitate natural regeneration of vegetation from saplings and soil seed banks; and

- vi. Plant indigenous site adaptive tree seedlings and grass immediately after construction works to ensure restoration of lost flora.
- (c) **Loss or reduction of biodiversity Ecosystem Services:** Clearing of vegetation from the project site for the construction of the solar power plant, access and service roads is likely to result in loss or reduction of biodiversity ecosystem services that occur at the project site. This may eventually result loss of livelihoods and habitats for fauna, including flash floods, which can cause loss of life and property.

Mitigation measures:

- i. Ensure that vegetation is selectively cleared from the project site and excavations are undertaken as per designs to avoid unwarranted clearance of vegetation;
- ii. Rehabilitate affected land by tilling the soils to facilitate natural regeneration of vegetation from saplings and soil seed banks;
- iii. Plant indigenous site adaptive tree seedlings and grass immediately after construction works to ensure restoration of lost flora;
- iv. Ensure that seasonal wetland grasses that are found on the western part of the project site are not completely cleared away;
- v. Prohibit workers from disturbing the seasonal wetland through complete clearing of vegetation and constructing campsites and maintenance vehicle works on this habitat..

2.1.3 Significance Rating of the Impacts

The significance of the identified potential environmental and social impacts has been determined by assessing the consequence and the probability of occurrence of the impact as follows:

$$\textit{Significance of the impact} = \textit{consequence} \times \textit{probability}$$

where:

$$\textit{Consequence} = \textit{severity} + \textit{reversibility} + \textit{duration} + \textit{spatial extent} + \textit{environmental context}$$

The factors are defined as follows:

1. **Severity/ Magnitude:** measures the general degree, extensiveness, or scale of impact. It is defined in terms of the observable impact on a resource in the context of the project locality and wider ecosystem or social domain.
2. **Reversibility:** refers to the ability of the site or the impact receptor to recover after an impact has occurred.
3. **Duration:** this is the period of time over which an impact may occur; from a once-off occurrence to continuous, during the life of the Project. This aspect considers the time that is estimated for an affected population or resource to return to "baseline" conditions. Duration is calculated from the time an impact begins to when it ceases. Frequency: considers the number of times an impact is expected to occur over the duration of a proposed project.
4. **Environmental context:** considers the sensitivity of the receptor upon which the impact is occurring.
5. **Areal extent:** refers to the size of the impact area.
6. **The probability:** the likelihood of the impact occurring.

The above factors are ranked using the criteria indicated in Table 1.17 below.

Table 1.17: Criteria for Ranking Factors for Consequences and Probability

Severity/ Magnitude	Reversibility	Duration/ frequency	Areal extent	Environmental context	Probability
5 – Very high/ don't know	5 – Irreversible	5 – Permanent and/or continuous impact	5 – International	5 – highly sensitive or very rare environmental component	5 – Definite / don't know
4 – High		4 – Long term (impact ceases after operational life) and/or very frequent impact	4 – National	4 – sensitive or rare environmental component	4 – High probability
3 – Moderate	3 - Recoverable (needs human input)	3 – Medium term (2 – 7 years) and/or frequent impact	3 – Regional	3 – moderately sensitive or uncommon environmental component	3 – Medium probability
2 – Low		2 – Short term (0 – 2 years) and/or infrequent impact	2 – Local	2 – non-sensitive or common environmental component	2 – Low probability
1 – Minor	1 – Reversible (regenerates naturally)	1 – Immediate and/or unique impact	1 – Site only	1 – non-sensitive and widely dispersed environmental component	1 – Improbable
0 - None					0 - None

Expert judgement is used when assigning the values for the factors. The maximum value that can be obtained for the significance of the impact is 125 points. The impacts are rated as of Very High, High, Moderate, Low or Very Low significance as shown in Table 1.18 following.

Table 1.18: Significance Rating of the Impacts

SIGNIFICANCE RATING FOR POSITIVE IMPACTS		
More than 100	Impact is of the highest order possible.	Very High
Between 76 and 100	Impact is substantial.	High
Between 51 and 75	Impact is real but not substantial in relation to other impacts.	Moderate
Between 26 and 50	Impact is of low order.	Low
25 or less	Impact is negligible.	Very Low
SIGNIFICANCE RATING FOR NEGATIVE IMPACTS		
Value	Description	Significance
More than 100	Impact is of the highest order possible. Mitigation is required to lower impacts to acceptable levels. Potential fatal flaw.	Very High
Between 76 and 100	Impact is substantial. Mitigation is required to lower impacts to acceptable levels.	High
Between 51 and 75	The impact is real but not substantial in relation to other impacts. Mitigation should be implemented to reduce impact.	Moderate
Between 26 and 50	Impact is substantial. Mitigation is required to lower impacts to acceptable level.	Low
25 or less	Impact is negligible. No mitigation is required.	Very Low

2.1.4 Significance Rating for Identified Impacts

The potential environmental and social impacts were assessed and the significance ratings before the mitigation measures are applied are as presented in Table 1.19.

Table 1.19: Impact significance rating before and after the mitigation measures are applied

ID	Potential Environmental impacts o Biodiversity and Ecosystem Services	Severity	Reversibility	Duration	Areal Extent	Environmental Context	Probability	Total	Significance without mitigation/enhancement	Significance with mitigation/enhancement
1.	BENEFICIAL IMPACTS									
1.1.	Construction Phase									
1.1.1.	Planting of indigenous side adaptive tree seedlings	5	3	4	2	5	4	60	Moderate	Very High
2.	ADVERSE IMPACTS									
2.1.	Construction Phase									
2.2.1.	Loss or destruction of habitats for fauna and flora	5	3	2	2	5	5	90	Very High	Very Low
2.2.2.	Loss of threatened flora and vegetation	5	3	4	2	5	5	80	Very High	Very Low
2.2.3.	Loss or reduction of biodiversity Ecosystem Services	5	3	2	2	4	3	60	Very High	Very low

3. CONCLUSIONS

3.1 Baseline

Habitat map and description

The project site is currently used for subsistence farming even though there are both indigenous and exotic flora species that are growing on the site. The main crops cultivated on the project site include Maize, Groundnuts, Cotton, Soya bean, Cucumber, Water Melon, Sorghum and Cow Peas. The project site has two distinct main habitats, namely: flat disturbed land, and seasonal valleyhead wetland.

The floristic composition of the project site is characterised by secondary mixed woodland. The common indigenous tree species on the project site are *Faidherbia albida*, *Markhamia obtusifolia* and *Comretum* spp while the common exotic flora species are *Gmelina arborea*, *Senna obtusifolia* and *Mangifera indica*.

Present Ecological State of the Project Site

The assessment that has been conducted on the project site using the IFC PS6 Guidelines, it is established that the project site is classified as a **Modified Habitat**.

Endemic and Endangered Species

There were no endemic species on the project site, including on the transmission line. However, there were two threatened species namely; *Pterocarpus angolensis* and *Dalbergia melanoxylon* that were surveyed and identified from the project site. These species, including *Faidherbia albida* are of conservation or ecological importance and therefore, care must be taken to ensure that their genetic pool is not wiped out from the site during the construction.

Ecologically Sensitive Areas

One area was identified as having ecological sensitivity, namely;

- *The Seasonal Valleyhead Wetland*. This seasonal wetland still provides habitat for cattle grazing and waterbird species (Cattle Egret).

Ecosystem Services

There are a number of ecosystem services that the project site offers to both the populace living around the site and to the fauna and flora that occur on the site. The ecosystem services that are likely to be impacted by the project are the following:

- Food Crops;
- Livestock Grazing;
- Wild plant fruits;
- Bushmeat;
- Timber;
- Fuelwood;
- Natural medicines;
- Regulating water flows;
- Erosion control;
- Regulation of soil quality;
- Pollination;
- Ethical values;
- Biodiversity maintenance, and
- Primary production.

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GEOHYDROLOGICAL DESK STUDY
FOR THE PROPOSED
JCM PV PLANT NEAR SALIMA, CENTRAL MALAWI

FEBRUARY 2018

DOCUMENT NUMBER

501711	V1.0	2018
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Compiled by

The logo for Aurecon, featuring a green leaf-like shape above the letter 'a' in the word 'aurecon', which is written in a bold, dark green, sans-serif font.

Project Title: Geohydrological Desk Study for the proposed JCM PV Plant near Salima, Central Malawi

Location: Salima, Central Malawi

Co-ordinates (WGS84): S 13.709910⁰
E 34.325013⁰

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Signed on behalf of
Aurecon:



M Terblanche

Date: February 2018

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1 INTRODUCTION

JCM Matswani Solar Corp Limited (“ProjectCo”) appointed Aurecon to conduct a feasibility study for a proposed 20 to 40 MWac solar PV plant located in Salima, Malawi. The site will be located on an 80 hectare site situated within 4km of the Salima (Nonjoka) substation.

This report will focus the baseline geohydrological conditions within the project area on a desktop level.

2 GEOLOGY

The proposed solar site and transmission line is situated in the centre of Malawi near the town of Salima. It is underlain by a charnockitic suite which has been subjected to gneissic foliation (Figure 1). It specifically consists of banded pyroxene-granulites, gneisses and hypersthene granite.

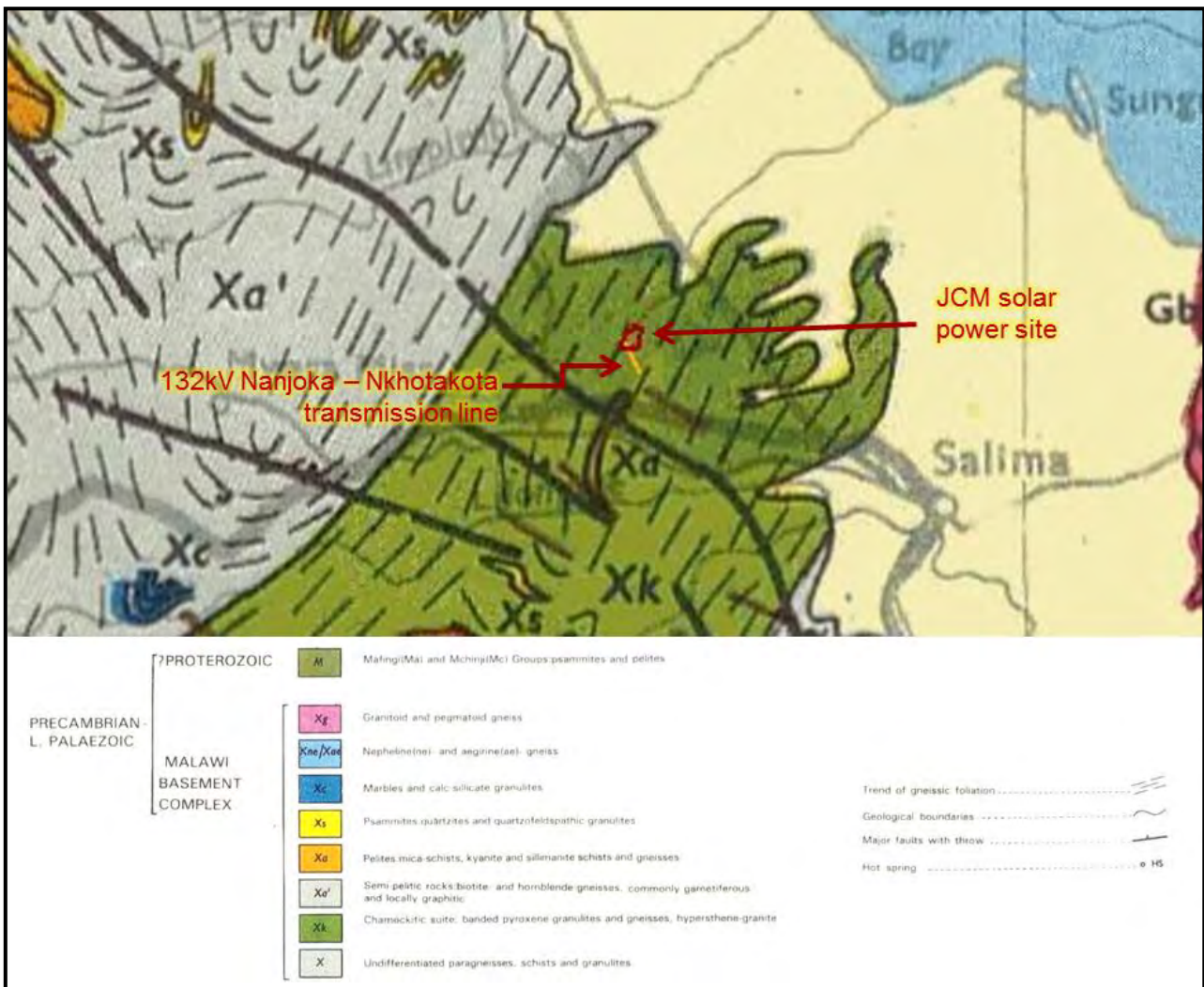


Figure 1: Geological map with the site indicated in red and the transmission line in yellow (Geological Survey Department of Malawi, 1966)

The rocks have been affected by orogenic episodes comprising the Ubendian, Irumide and the Mozambican cycles. Only the latter cycle influenced the area where most of the Basement Complex became regionally metamorphosed and migmatized to a greater or lesser extent. Plastic deformation were common and large areas of biotite and hornblende gneisses, charnockitic granulites and gneisses were produced. The latter are expected on the site.

3 GEOHYDROLOGY

Aquifers within the occurring geology consist of secondary fractured aquifers and groundwater occurrence in these mainly charnockitic rocks is generally associated with zones of weathering, and the contact between the weathered and fresh materials. (Chilton et al, 1983)

Above the fresh bedrock is a zone of fractured and hydrated rock where the joint surfaces are chemically weathered but the centres of the blocks remain fresh and unweathered. The first signs of weathering are often brown limonite stains on otherwise fresh surfaces, but gradually the blocks become more weathered around the edges leaving a hard corestone at the centre. This grades into a zone of crumbling and decomposed bedrock which retains the original rock structures such as quartz veins and joint surfaces. Partly decomposed feldspar crystals can often be observed. These lower layers, which are often of sandy or gravelly texture, usually have the highest permeability and effective porosity, especially where the clayey material has been removed or redistributed by groundwater as it is formed. Above there are commonly pale brown clayey sands or sandy clays, often with many small loose quartz fragments and mica flakes. This whole sequence makes up the aquifer and is commonly 10 to 25 m thick. The aquifer is partly confined by an overlying thickness of 5 to 20 m of red brown clays and latosols, the final products of complete weathering. These surface layers are usually very tightly compacted and have very low permeability. (Chilton et al, 1983)

Groundwater is commonly first struck near the base of the clays, and usually rises (sometimes by several metres) before static water level is found. The saturated thickness of the aquifer will be a critical factor in determining whether sufficient yields can be supplied, even for rural domestic supplies for hand pumps. Where the weathered zone is too thin, or the depth to water is too great (even where there is a deep weathered zone), potential yields are likely to be insufficient. Another important factor is the permeability of the saprolite; even if there appears to be a sufficient saturated thickness of weathered material, a very clay-rich sequence may result in very low permeability and inadequate borehole yields. (Chilton et al, 1983)

The fresh bedrock underlying the weathered zone is rarely a significant aquifer, except where it is extensively fractured as the available storage is negligible in the rock matrix and likely to be low in the fracture. Although there are many old boreholes which have been drilled to considerable depths into fresh bedrock on the plateau areas (often reaching 50-70 m) these rely largely on storage in the overlying weathered zone. (Chilton et al, 1983)

3.1 Groundwater level

In the weathered basement aquifers, groundwater is usually struck at a level below the static water level, and it then rises, sometimes by several metres. This is evidence of the semi-confining nature of the surface strata. The extent of the rise in water level reflects the degree of artesian pressure and depends on many factors including the lithology, the topographic position. The depth to

groundwater rest level is generally less than 25m and commonly less than 15m below surface (Chilton et al, 1983).

3.2 Groundwater Yield

According to the BGS Report (IR/10/103), a successful borehole in this fractured aquifer has a potential yield of between 1800 and 7200l/h. Chilton et al, 1983, reported that in the weathered basement aquifer, yields are generally higher where the saturated thickness of the weathered zone is greatest and the bedrock coarsest. The higher yields are likely to occur where the weathered zone is associated with fractures which commonly allows greater depths of weathering. These zones can sometimes be picked out as lineations on aerial photos.

3.3 Groundwater Quality

No recent groundwater quality data within the project area could be obtained for the study. The available chemical data (Chilton et al. 1983) suggests that the total mineralisation of groundwater in the plateau areas is generally very low, indicating that the weathered zone is highly leached of soluble minerals and the groundwater is likely to be derived from relatively recent recharge. The electrical conductivity (EC), which is indicative of the concentration of total dissolved solids, is generally very low, usually less than 150 mS/m and commonly below 75 mS/m. However, there are very local erratically distributed areas where the EC is greater than 300 mS/m which may be related to variations in bedrock mineralogy, or mineralisation in fault zones. Those areas towards the rift valley escarpment often have water of higher EC, which could be a function of more extensive faulting and a thinner, less leached zone of weathering. The weathered basement at the foot of the escarpment also tends to have water with higher conductivities.

The water quality can be very variable even over short distances which is evidence of low aquifer permeability, slow groundwater movement and little mixing. For example several samples from water points in the then Dowa West Integrated Project area have saline water with EC approaching 400 mS/m whereas fresh water with EC less than 100 mS/m can occur sometimes only a few hundred metres away. The poor quality is principally due to high sulphate levels and there can be considerable differences between water points even within one village. A survey of water quality in existing boreholes and dug wells in the area before the project commenced did not reveal any particularly high conductivities and on the basis of these results the water quality problem could not have been foreseen without more detailed investigations. The impression of water quality was distorted because the non-functioning boreholes, which were not sampled, were subsequently found to have fallen into disuse largely because of saline water. The distribution of saline water does not appear to be easily related to differences in bedrock composition, and it could be due to mineralisation along fault zones. Very localised but significant variations were also shown by investigations at Timadzi, near Lilongwe (Chilton et al, 1983).

3.4 Groundwater Recharge

The mean annual precipitation and annual recharge figures in the area of the site Table 1. The value were obtained from the Groundwater Resources of Malawi Report (Chilton et Al, 1983).

Table 1. Rainfall & Recharge in the study area

Mean Annual Rainfall (mm)	800 - 1200
Annual Recharge (mm)	19

Annual Recharge (%)	1.9
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3.5 Groundwater Use

Based on aerial photo interpretation, available information and the villages present within the project area, it can be assumed that boreholes are present and groundwater is used for domestic purposes as a minimum. This should however be verified by means of a hydrocensus. It is further assumed that the villages within the project area do not have access to piped water.

4 CONCLUSIONS

From the above information provided, the following can be concluded:

- The site is underlain by a charnockitic suite which has been subjected to gneissic foliation. It specifically consists of banded pyroxene-granulites, gneisses and hyperstene granite.
- Aquifers within the occurring geology consist of secondary fractured aquifers and groundwater occurrence in these mainly charnockitic rocks is generally associated with zones of weathering, and the contact between the weathered and fresh materials.
- The depth to groundwater rest level is generally less than 25m and commonly less than 15m below surface.
- A successful borehole in this fractured aquifer has a potential yield of between 1800 and 7200l/h.
- The electrical conductivity (EC is generally very low, usually less than 150 mS/m and commonly below 75 mS/m.
- The annual recharge in the study area is 19mm (2%).
- The groundwater in the study area is most likely used for domestic purposes.
- Groundwater quality is highly variable, even over short distances.

5 RECOMMENDATIONS

From the conclusions drawn in Section 4, it is recommended that a site visit be conducted. The field work required during the site visit would consist of:

- A hydrocensus of minimum of 1km radius around the site
- Sample collection from the geotechnical boreholes to determine water quality within the project area.
- Water level depth measurements in geotechnical boreholes
- Geological logging of geotechnical boreholes
- Collection of relevant documentation (Maps, reports etc.) from the relevant authorities.

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Progress Report – February 2018

Project Name: Geotechnical Investigation for the proposed Salima Solar Plant

Project Number: 501711

Reporting Period: Period ending 22 February 2018

Compiled: Confidence Tshilande

Section 1: Summary

- The Aurecon Health and Safety File was compiled.
- Stakeholder engagement meeting was held with Aurecon representative, Confidence Tshilande
- Safety induction was conducted by Confidence with the subcontractor and labourers.
- All field investigations have been completed and all demobilisation was completed.
- Samples were taken to the Laboratory in Lilongwe for testing.
- Reporting is underway.

Section Two: Activities and Progress

- Aurecon signed the task order on January 2018 and submitted it to Janice Forster
- Subcontractors and a laboratory in Malawi were sourced.
- Confidence Tshilande departed on 05 February 2018 to Malawi.
- On arrival, Confidence visited Geoconsult Laboratory in Lilongwe to check its conditions and capabilities.
- On 6 February, Confidence went to Salima where she met the client representative, District Land Officer, Group Village Headman and the Community Liaison Officer (CLO). It was agreed that the community should be informed of the activities to be conducted on site.
- A site walk-over was done in the afternoon to check access to the proposed test pit positions.
- The appointed subcontractor for plant hire was not reachable the day before fieldwork was expected to begin, so Confidence looked for alternative options for plant hire.
- A plant company was contracted on 7 February 2018.
- A meeting was held on the 7th of February 2018 to introduce to the community the fieldwork and project activities to be conducted.
- A representative committee was also selected from the community members.
- The meeting attendees comprised of Aurecon Geotechnical Engineer – Confidence Tshilande, Client Representative (JCM) – Jonas Sam, CLO -Itayi Nkhono, District land officer -Blessings Mahala, Group Village Headman – Chief GUH Kanzimbe and Kanzimbe community members (Figure 1).



Figure 1: Stakeholder engagement meeting in Kanzimbe village

- Induction was held on 8 February 2018 with the subcontractor and fieldwork assistants.
- Fifteen (15 No.) test pits were excavated on site to log the soil properties
- Progress was delayed due to heavy rains and subsequent ponding of water at surface.
- Due to access difficulties, only ten (10 No.) of the test pits were excavated using a Backhoe (TLB)
- The remaining 5 No. test pits were excavated by hand and logged on 13 February 2018.
- Samples for laboratory testing were taken to Geoconsult Laboratory at Lilongwe.
- Positions of outcrop were also noted and recorded.

Position	Easting	Northing	Comment
STP 1	643411	8484638	TLB excavation
STP 2	643732	8484549	TLB excavation
STP 3	643615	8484263	TLB excavation
STP 4	643492	8484356	TLB excavation
STP 5	643136	8484312	TLB excavation
STP 6	643426	8484112	Hand excavation
STP 7	643679	8484107	TLB excavation
STP 9	643282	8483982	Hand excavation
STP 10	643047	8484051	Hand excavation
STP 11	642986	8483871	Hand excavation
STP 12	643220	8483789	Hand excavation
STP 13	643565	8483800	TLB excavation
STP 14	643422	8483639	TLB excavation
STP 15	643137	8483615	TLB excavation
STP 16	642858	8483641	TLB excavation
Outcrop a	643248	8483784	
Outcrop b	643258	8483830	

Outcrop c	643346	8484016	
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Section Three: Findings

The eastern section of the proposed site is located on a section of Kanzimbe farms of cotton, maize, peanuts etc, as shown below:



Figure 2: Crops on the eastern side of site

The western sections comprise of grazing land for cattle and goats as shown below.



Figure 3: Western section of the site

Due to the low permeability of the top clay layer, the western section of the site accumulates surface water during rainy seasons as shown below.



Figure 4: Surface water accumulated on the western section of the site

Based on the test-pits profile descriptions the site can be classified into the three zones as shown in Figure 5 below:

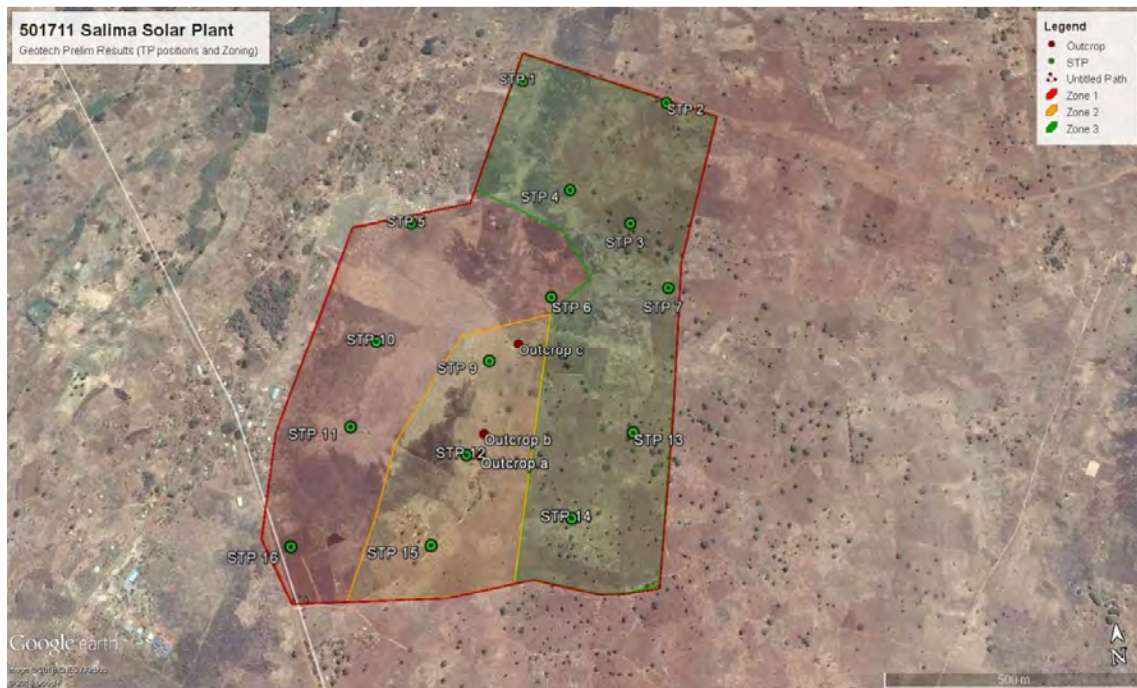


Figure 5: Site zoning and test pit positions

Zone 1

The typical soil profile in this zone generally comprises 0.3m thick topsoil described as very moist, dark grey brown, very soft, sandy clay with roots. This layer is underlain by approximately 0.9m thick transported layer and described as very moist, grey brown, soft to firm, sandy clay. Below the transported horizon, is the residual gneiss layer, which is described as moist, grey brown speckled white, stiff to very stiff, intact, sandy clay with gravel and pebbles. Most of the test pit sidewalls in Zone 1 were unstable as shown in Figure 6 below.



Figure 6: Unstable test pit at Zone 1

Zone 1 was the most difficult section to access due to rain water accumulation on surface as shown below:



Figure 7: Surface water on site

Zone 2

The typical soil profile in this zone generally comprises 0.3m thick topsoil described as very moist, dark brown, loose, silty sand with roots. This layer is underlain by a transported layer described as moist, brown, loose to medium dense, clayey sand. Below the transported horizon, is the residual gneiss layer, which is described as moist, grey brown speckled white, stiff to very stiff, intact, sandy clay with ferruginised gravels. This layer is underlain by pedogenic layer of hardpan ferricrete with a very dense overall consistency. Ground water seepage was noted on this zone. Hard rock gneiss outcrop was also noted in this zone.



Figure 8: Test pit in Zone 2

Big trees, termite hills and outcrop are present in this zone, as shown below:



Figure 9: Outcrop noted in Zone 2

Zone 3

The typical soil profile in this zone generally comprises 0.3m thick topsoil described as very moist, dark grey brown, soft, sandy clay with roots. This layer is underlain by approximately 0.9m thick transported layer described as very moist, grey brown, firm to stiff, sandy clay. Below the transported horizon, is the residual layer, which is described as moist, grey brown speckled white, stiff to very stiff, intact, sandy clay with gravel. At the bottom of the test pits is a completely weathered granite gneiss which was excavated as sandy gravel material.



Figure 10: Test pit profile in Zone 3

Although

Section Four: Deviations from actual scope and proposal

- Change of subcontractor – the subcontractor appointed initially before departure was no longer reachable on 6 February 2018. An alternative subcontractor was appointed on 7 February 2018 and began work on 8 February 2018.
- Due to access difficulties only fifteen (15 No.) test pits were excavated out of the planned sixteen (16 No.) positions.
- Some of the positions were shifted because they were positioned on areas with crops.

- Test pits excavated by hand could only be dug to 1.5m for safety purposes.
- Rainy conditions were experienced from the 8th to the 11th of February 2018 which shifted expected completion date from the 10th to the 13th of February 2018.
- Due to access restrictions (saturated soil conditions), it is proposed that the pull out testing be cancelled. Indicative pile capacity information will be provided.

Section Five: Concerns, Risks, Issues and Challenges

- Additional time and costs were incurred due to the Section 4 deviations.
- Conditions noted in Zone 1 at Section 3 above will pose access difficulties during construction and will require substantial drainage measures.

Section Five: Recommendations

- Based on the outcomes of the preliminary geotechnical investigation, it is recommended that the site footprint be shifted to eastern side of Zone 3 to minimize costs and constructions risks that may be posed by flooding and standing water. Excess surface water might cause access difficulties during construction, corrosion of materials and will require substantial drainage measure.
- Based on current information, we estimate that there are typically three zones based on the ground profile descriptions which can be differentiated as follows:
 - Zone 1 comprises surface water which accumulated after heavy rains
 - Zone 2 comprises good founding material and outcrops.
 - Zone 3 comprises if farming land and can be easily accessible.
- Due to the current waterlogged topsoil and ponding of water it will be difficult to conduct the pull-out and lateral load test on the proposed pile foundations. The rainy season is expected to taper down towards the end of March. This will exceed our current programme with the client. It is therefore proposed that we do not carry out the tests now.
- Based on the profile descriptions and the laboratory tests, we could possibly provide indicative pile capacity recommendations.

Annex D

Stakeholder Engagement Documentation

D1 **STAKEHOLDER ENGAGEMENT ACTIVITIES UNDERTAKEN DURING THE ESIA AND FEEDBACK FROM STAKEHOLDERS ⁽¹⁾**

D1.1 **STAKEHOLDER ENGAGEMENT ACTIVITIES**

This Section outlines stakeholder engagement activities that have been carried out to date in support of the Project, and the process required for the ESIA and RAP/LRP.

D1.1.1 ***Stakeholder Engagement Activities Undertaken Prior to the ESIA***

Stakeholder engagement undertaken in support of the Project so far has primarily been related Phase I of the land acquisition process, and was undertaken by the Salima District Commissioner. However, other engagement has been in relation to the LACS and CSR studies, as mentioned in *Section 1.6* (Project activities carried out to date) above, and included in the following. A summary of the meetings held and key points raised that are considered in the ESIA and land acquisition process for additional land required by the Project (Phase II of land acquisition) is detailed below.

Initial Engagement

Initial engagement involved meeting Regional and District Lands Officers to gather information on the land acquisition and compensation process in Malawi, and in relation to the Project. Additionally, meetings were held with community leaders and representatives of compensation beneficiaries.

A summary of meetings held in relation to initial engagement, including feedback regarding the first phase of land acquisition is provided in *Table 1.1*.

(1) Please note this information was extracted from the main ESIA Report as requested by the EAD

Table 1.1 Initial Engagement

Date	Stakeholder	Summary of Points Raised for Consideration in the ESIA and Land Acquisition Process
13/11/17	Mr Sikoti - Representative from the lands office that was involved in the LA process	<ul style="list-style-type: none"> • Explained that all displacement was economic with the exception of one household, which was the Kanzimbe Group Village Headman who was physically displaced. • Recognition of the gaps in relation to the process against the IFC. As there are limited resources to address requirements beyond those required by Malawi law
13/11/17	Regional Lands Commissioner, Lilongwe	<ul style="list-style-type: none"> • Stated that new land laws have been prepared and will be gazetted in 2018.
14/11/17	Salima District Commissioner and the District Lands Officer	<ul style="list-style-type: none"> • There is no formal process of identifying vulnerable groups in Malawi and more needs to be done regarding this. • The Project could support with income generation activities including business training and outgrowers schemes.
14/11/17	Meeting with community representatives and chiefs in Kanzimbe Village	<ul style="list-style-type: none"> • Explained that the community understand the Project. • Confirmed that the Senior Chiefs house was the only house that was relocated. • The community were required to find their own replacement land for farming. • Positive feedback regarding the compensation received and how the compensation was spent. • Stated that 5 people opened bank accounts. • Request from the women to help establish a women's group for small business and microcredit. • Asked if they could still cultivate the land that was acquired. The ProjectCo representative gave approval for this, but highlighted that they will need to stop using the land prior to construction and that no more compensation will be distributed. • Also asked about employment and the Project schedule.
15/11/17	Kalonga Traditional Authority	<ul style="list-style-type: none"> • So far, the TA is pleased with Project progress and feels that it has been more beneficial to affected people and to the Project itself as the compensation has helped improve lives.

Social Baseline Engagement for LACS and CSR Studies

As part of the data gathering process for LACS, communities and stakeholders were provided with an overview of the Project and asked if they had heard about it previously. Additionally, information was gathered regarding perceptions on potential Project impacts.

Most stakeholders met during the social surveys reported that they had heard about the Project; however mainly from people that had received compensation from loss of land.

Women in Kanzimbe had incorrectly understood that the Project is being undertaken to supply power in the village resulting from the current lack of ESCOM power/ electricity, when it will be supplied directly to the national grid. In Mayambo, women said that they had been informed about the Project by the government. Men in Kanzimbe and Mayambo stated that they felt they had a good understanding of the Project and mainly heard about it through land valuers. The teacher at Namanda Primary School stated that information regarding the Project had been informally communicated and that they did not have sufficient understanding of the Project.

A summary of the key issues raised is provided in *Table 1.2* below. This feedback has informed the initial scoping of potential impacts that have been considered in the ESIA.

Table 1.2 Project Feedback and Perceptions

Topic	Perceptions	Project Response/ESIA Reference
Job creation / economic improvements	<ul style="list-style-type: none"> Parents will be hired as casual labourers and thus be able to raise some money to provide for the learning needs of their children, including uniforms and books. Provision of job opportunities, mainly for unskilled labourers in the community, which would help improve the economic situation of households. Increased sale of produce resulting in increased income generation for traders at Kanzimbe Trading Centre resulting from the presence of the Project workforce. 	<ul style="list-style-type: none"> Refer to <i>Section 8.2</i> (Employment and the Economy)
Land take	<ul style="list-style-type: none"> Fear that the Project may require additional land affecting Kanzimbe Trading Centre and farmland. 	<ul style="list-style-type: none"> At the time of this engagement additional land for the Project was required and has since been surveyed as part of the LRP.
Environmental impacts	<ul style="list-style-type: none"> Air pollution resulting from construction activities. Construction of a protected Project waste disposal site, away from schools is required. 	<ul style="list-style-type: none"> Refer to <i>Section 9.1</i> (Air Quality) Refer to <i>Section 9.13</i> (Unplanned Events)
Access to power	<ul style="list-style-type: none"> Access to power will reduce deforestation and reduce the impact of climate change. Increased study time for students and improved school grades resulting from access to power. Possibility for solar energy to be connected to Kanzimbe Trading Centre enhancing business opportunities eg mobile phone charging. Access to power will improve livelihoods Access to power for lighting. 	<ul style="list-style-type: none"> It will be up to ESCOM to connect the communities to the national grid, however ProjectCo is intending to undertake community investment activities that include rural electrification. The scope is this is yet to be determined.
Safety and security	<ul style="list-style-type: none"> Increased theft. Ensure the site is well secured to reduce incidences of theft. 	<ul style="list-style-type: none"> Refer to <i>Section 9.11</i> (Community Safety and Security)
Gender - female	<ul style="list-style-type: none"> Risk for girls to be enticed by male workers. For example, a small irrigation development led to a number of girls dropping out of school due to pregnancies. Females engaging in sex work to support income generation resulting from parents advising older girls to fend look after themselves. Marriage breakdowns from polygamy or marital affairs with the workforce and aspiration for improved living standards The skilled female workforce could act as mentors for girls in the community to complete their education. 	<ul style="list-style-type: none"> Refer to <i>Sections 9.11</i> (Impacts in STI/HIV transmission and Community Safety and Security)
Gender - male	<ul style="list-style-type: none"> Men have become more mobile from the cash from the selling of land and drinking is on increase. Sensitisation is needed 	<ul style="list-style-type: none"> The LRP process will include development of an eligibility and entitlements matrix that will include like-for-like compensation to prevent mis-use of cash compensation.

Topic	Perceptions	Project Response/ESIA Reference
Health	<ul style="list-style-type: none"> • Increased spread of HIV resulting from influx and the presence of the workforce. • Sensitisation is required in schools and in the communities regarding sexual health, involving key decision makers and community change agents. • Increase in respiratory illness from dust during construction. Spraying of water on the roads is required to mitigate dust emissions. • Distribution of condoms in communities, schools and to the Project workforce. • Unwanted pregnancies, breaking up of families and spread of sexually transmitted diseases and HIV/AIDS resulting from interaction with the workforce. 	<ul style="list-style-type: none"> • Refer to <i>Sections 9.11</i> (Impacts in STI/HIV transmission and Community Safety and Security)
Stakeholder Engagement	<ul style="list-style-type: none"> • Direct engagement with Project affected communities rather than through the government or chiefs in order to keep informed about developments and to participate in decision-making. 	<ul style="list-style-type: none"> • Refer to <i>Annex D</i> (Stakeholder Engagement Plan)
Positive comments	<ul style="list-style-type: none"> • The Project will contribute to improving the livelihoods of the community. • The Project is a welcome development that will bring benefits to the community and surrounding areas. • Use of cleaner and renewable energy. • The site will enable Namanda Primary School to have access to a learning site for their renewable energy class. 	<ul style="list-style-type: none"> • Benefits will be considered in the development of a Community Investment Plan based on CSR Feasibility Studies undertaken by ERM in January 2018 that ProjectCo will develop at a later stage, with elements incorporated into the LRP.

D1.1.2

ESIA and LRP Stakeholder Engagement Process

In order to avoid stakeholder fatigue there are three main stages of engagement that form the ESIA and LRP process. These include engaging on the draft scoping report, which incorporates feedback already captured, as well as presenting the Project and gathering feedback from additional communities in the social AoI. Additionally, a third stage of engagement will be undertaken on the draft ESIA/LRP or LRP/ disclosure, which will include consultation on the impacts and associated mitigation identified. Engagement for the ESIA process is presented in *Figure 1.1* below.

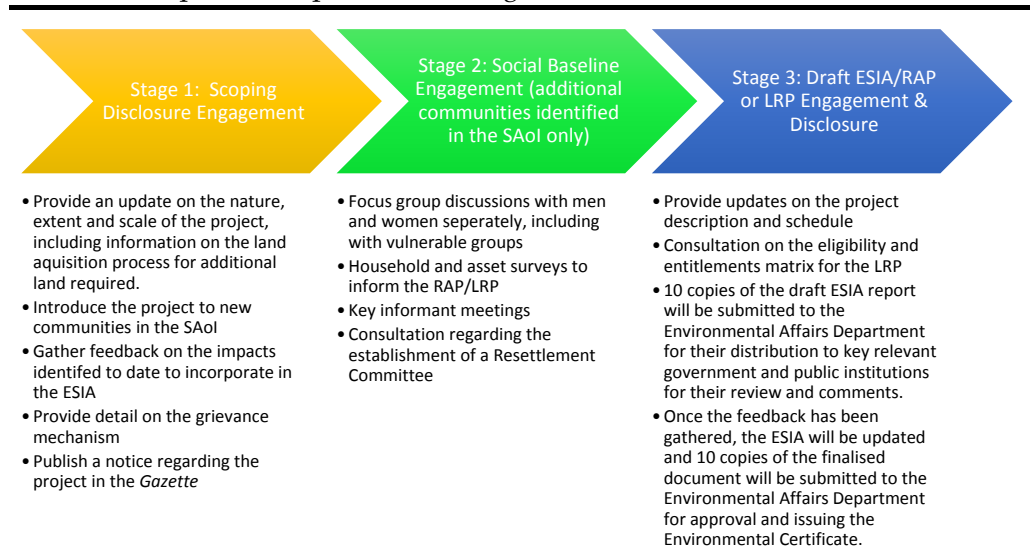


Figure 1.1

ESIA and RAP/LRP Engagement

Stage 1 and 2 of the engagement process has been undertaken and details regarding these are provided below. At the time of writing the ESIA, Stage 3 was pending.

Stages 1 and 2: Scoping Disclosure Engagement, and Social Baseline Engagement – Activities and Outcomes

Stage 1 of the engagement process was carried out between the 23rd and the 27th of April 2018, and Stage 2 carried out between 29th May to 02 June 2018. Stage 1 included meeting with national, district, and local level stakeholders, building on from engagement that has already been undertaken in support of the Project.

Engagement materials developed for this stage of engagement included the following;

- Background information document in English and Chichewa to provide a high level overview of the Project, impacts and contact details for comments/grievances to be submitted;

- Flyers for the meeting in Chichewa were posted in affected communities.
- A pictorial community presentation that illustrated the Project footprint, potential impacts, ESIA and land acquisition process, and provided contact details for comments/grievances to be submitted;
- A technical presentation for the government, NGOs, and other stakeholders; and
- A question and answer guide (Q&A) for community meeting facilitators.

All meetings were documented, including meeting registration, photos and meeting minutes. Additionally, feedback on the meeting process was gathered where appropriate using meeting feedback forms and verbally.

Box 1.1

Meeting Feedback Questions

- | |
|--|
| <ul style="list-style-type: none"> • Was the meeting useful? • Was the information presented in a clear manner and do you feel that you have a good understanding of the Project activities and plans? • Were you able to ask the questions you wanted? • Was this meeting organised in a way to facilitate your attendance? |
|--|

Information gathered from the feedback process will help to inform the organisation of future engagements and support monitoring and evaluation requirements, as detailed in the SEP.

Details of the activities and outcomes for this stage of engagement are provided below and the all stakeholder engagement materials and meeting minutes for Stage 1 of engagement are provided in *Annex D*.

National and District Level Engagement

Using the materials described above the Project team arranged and met with the key government departments that play a role in the Project, for approvals or to provide feedback to feed into the ESIA.

A summary of the engagement is provided in *Table 1.3* and photos of the meetings are provided in below.

Table 1.3 National and District Level Engagement

Date	Stakeholder	Comments Raised	Project/ESIA Reference
23 April 2018	Environmental Affairs Department	<ul style="list-style-type: none"> • The EAD were positive about the Project and indicated that it would align with the government’s climate change management policy and help meet the countries Paris Agreement determined contributions to reduce emissions. • They recommended that the Electricity Generating Company (EGENCO) and the Department of Energy (DOE) should also be consulted; and that the consultant should involve the District Environmental Officer at Salima. • What waste will be generated and how will it be managed? • What is the life cycle of the Project and what will happen at the end of the Project life? 	<ul style="list-style-type: none"> • During construction, the main waste will consist of packaging material, which will be disposed of in designated waste disposal sites as guided by the Salima District Council. Any broken panels or hazardous waste will be disposed of by the contractor, in line with the ESIA recommendations (refer to <i>Section 9.13</i>). • The life cycle of the Project is 20 years. A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility (refer to <i>Section 10.5.6</i>)
23 April 2018	ESCOM	<ul style="list-style-type: none"> • People were compensated for the existing transmission line that runs from the Nanjoka substation through the Project site. • ESCOM confirmed that the wayleave width is 30 meters. • ESCOM emphasised that displacement of people should be avoided 	<ul style="list-style-type: none"> • The comments from the ESCOM will be incorporated into the LRP being developed for the Project (refer to <i>Section 9.7 Land Acquisition and Displacement</i>).
23 April 2018	MERA	<ul style="list-style-type: none"> • Issuing of licenses by MERA to the IPPs is based on the Environmental and Social Impact Assessment (ESIA) approval certificate and acquisition of land according to the national procedures. • MERA does not have an institutional environmental policy. • In reaction to how the communities can benefit from the Project directly (i.e. from the generated electricity) MERA stated that a min- grid framework is being developed and this would provide modalities of how communities can be supplied with electricity from mini-grids. • MERA is concerned with safety on construction sites and therefore the ProjectCo must observe all the relevant safety regulations, both during construction and operation. 	<ul style="list-style-type: none"> • Benefits will be considered in the development of a Community Investment Plan that ProjectCo will develop at a later stage, with elements incorporated into the LRP. • Refer to <i>Sections 9.9 (Vector Borne and Communicable Diseases) 9.9 (Community Safety and Security) and Traffic Impacts Section 9.13</i>

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Department of Labour	<ul style="list-style-type: none"> How many people will be employed? Where will labour be sourced from and what is the balance between local and foreign labour? There will be need to register the construction site with the Ministry of Labour (a licence will have to be issued). An operating licence is also a requirement by the Ministry of Labour Facilities (toilets, water) must be provided to workers. A safety committee must be established where there are more than 50 workers. There will be need to have a fence around the construction site and PPE will have to be provided to the workers. 	<ul style="list-style-type: none"> The majority of people will be required during construction. These will be employed from the local community or Salima Town where possible. Skilled labour may be sourced from outside Salima District. During operation, only a few people will be required to maintain the security of the premises, as the solar panels do not require to be operated by anyone. Refer to Sections 9.6 (Vector Borne and Communicable Diseases) 9.9 (Community Safety and Security), 9.6 (Labour and Working Conditions) and 8.2 (Employment and the Economy)
24 April 2018	Department of Lands	<ul style="list-style-type: none"> When will the Project start and how long will construction take? What will be the affected area? Has a Resettlement Action Plan (RAP) been prepared? 	<ul style="list-style-type: none"> The Project is due to start construction at the beginning of 2019 and construction will take approximately 9 months. The Project site is approximately 168 Ha and the wayleave for the transmission line is 30m wide over 3-4 km. A RAP has not been prepared as it is envisaged that there will not be any people to be resettled; one structure used for economic activities (eg goat farming) was identified during survey undertaken June 2018, however ProjectCo is seeking to divert the transmission line to avoid it. However, a Livelihood Restoration Plan (LRP) will be prepared for those economically displaced (refer to <i>Section 9.7</i> Land Acquisition and Displacement). The LRP will be submitted to the Department of Lands.

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Ministry of Transport and Public Infrastructure	<ul style="list-style-type: none"> • What are the activities that will take place for the road construction? • The Solar farm at Kamuzu International Airport (KIA) has problems of sustainability with rates (tariff). How will this be taken care of for the proposed Project? • Land (farmland) in Salima is an issue. Is the Project intending to provide alternative land? • Solar panels emit infra-red radiation. How close is the nearest habitation? What impacts will there be on birds? • What will happen to the surrounding community? Will they have access to electricity? • Cleaning the solar panels with water will be unethical in a place where potable water is not sufficiently available to the community. How does the Project intend to provide water? 	<ul style="list-style-type: none"> • The existing site access road will be graded as necessary to accommodate the anticipated Project traffic. • The ProjectCo is discussing the tariff with the relevant authorities (not part of the remit of the ESIA). • Benefits will be considered in the development of a Community Investment Plan based on CSR Feasibility Studies undertaken by ERM in January 2018 that ProjectCo will develop at a later stage, with elements incorporated into the LRP. This will potentially include rural electrification, water and sanitation, and agriculture. • The Project is designed to sell electricity to ESCOM and feed directly to the national grid. Hence, the communities in the Project area cannot be connected directly to the solar power plant. • Refer to <i>Sections 9.7 (Land Acquisition and Displacement), Section 9.4 (Groundwater), Sections 9.9 (Vector Borne and Communicable Diseases) 9.11 (Community Safety and Security), 9.5 (Biodiversity)</i>
24 April 2018	Ministry of Agriculture, Irrigation and Water Development	<ul style="list-style-type: none"> • What will what happen to the solar power plan after the 20 years? • The Project will generate up to 40 MW of electricity. The Ministry enquired how many households will be able to connect to this amount of electricity. 	<ul style="list-style-type: none"> • A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility (refer to Section X) • It will be up to ESCOM to decide if any communities will connect to the grid. However, CSR Feasibility Studies were undertaken by ERM in January 2018, which consider rural electrification options. ProjectCo are seeking to undertake community investment at a later stage to enhance community benefits resulting from the Project.

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Salima District Council	<ul style="list-style-type: none"> • What is the plan for the people who will be displaced? • Will the solar system include batteries? If yes how will the batteries be managed in terms of disposal? • How will the Project be decommissioned after the Project period? • What are the examples of the community investment programs that the Project will implement? • What will be the mitigation measures put in place by the Project to manage waste from the Project site? • Will the Project source water from the community water sources? • How will the Project address visual impacts/glare? • Is there going to be any legal document on the corporate social responsibility between the Project implementers and the communities or district council or the government? • How will the Project ensure women safety from sexual abuse and GBV from the Project staff (even their husbands in the homes? Men tend to abuse women when they are empowered economically through such works; hence the fear from women 	<ul style="list-style-type: none"> • No large scale batteries will be used as part of the Project. • Refer to <i>Section 9.7 (Land Acquisition and Displacement), Section 9.10 (STIs/JHIV), Section 9.11 (Community Safety and Security) Section 9.13 (Waste), Section 9.4 (Groundwater), Section 9.6 (Landscape and Visual)</i> • A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility. • A CSR Feasibility study has been completed which focuses on potential investments in agriculture, water and sanitation, and electrification. There is currently no legal document in place for this.
26 April 2018	Ministry of Lands (district)	<ul style="list-style-type: none"> • The meeting's main agenda was to discuss the land acquisition process and how the local process could be aligned with the IFC Standards • No one is forced to sell their land or sign any documents, however the parties enter into negotiations with the land owner • Grievance Committees: these are established in the communities during the consultation meetings to be able to handle any issues that will likely come out of the proposed Project, especially as it relates to land. • There are discrepancies between the IFC/world bank standards and the Malawian regulations when it comes to land acquisition and compensation. 	<ul style="list-style-type: none"> • Refer to <i>Section 9.7 (Land Acquisition and Displacement), Annex D (Stakeholder Engagement Plan)</i>

Date	Stakeholder	Comments Raised	Project/ESIA Reference
26 April 2018	District Council Environmental Officer	<ul style="list-style-type: none"> • The Project area is largely cultivated. • Licenses are required to cut down certain trees. • No protected areas near the Project Site • Main drivers of environmental degradation include: <ul style="list-style-type: none"> ○ Charcoal burning, and ○ Agricultural and settlement expansion. • Baobabs are threatened in Malawi. Forestry department must be informed prior to clearance of baobabs. • Waste sites are very basic (not lined) and poorly managed. 	<ul style="list-style-type: none"> • Refer to <i>Sections 9.5 (Biodiversity)</i>, <i>Section 9.13 (Waste Management)</i>



Figure 1.2 *Photos of National and District Meetings*

Photos: Left- ESCOM, Right- Salima District Council Environmental officer

Community Level Engagement

In addition to national and district meetings, meetings were also held with communities covering a number of villages in the Project area. The purpose of the meetings was to provide a more in depth description of the Project that they had received previously, explain the ESIA process, explain some of the key impacts identified during the scoping process and gather feedback to feed into the ESIA. A total of three community meetings were held, representing affected people surrounding the Project Site and along the transmission line wayleave.

Table 1.4 shows the meetings held in each community and the demographics of each meeting. As the figures show, women were well represented in all the meetings held.

Table 1.4 *Community Meetings*

Date	Location	Villages Represented	Females	Males	Total
24 April 2018	Kanzimbe	Kanzimbe, Kanzimbe 2, Menyako, Maiezi, Mputeni, Jephytala, Malezi	45	40	85
25 April 2018	Mayambo	Mayambo, Njoka, Kanthiti, Chishasha, Kachepela	44	46	100
26 April 2018	Nanjoka	Waya 1, Santhe, Motolo, Sadzu, Malezi, Thangani, Mwape, Malumbula, Michembo, Vonguti, Kuso, Chiwaka	74	54	128
Total			163	140	313

In addition to community meetings, Stage 2 of engagement involved undertaking focus group discussions and key informant interviews were undertaken to gather gender and topic related information. A full list of meetings is provided in Annex D. The outcomes and Project response from all the meetings is detailed in Table 1.5 below. Photos of community meetings are provided in



Figure 1.3 below.

Table 1.5 Stage 1 and 2: Community Level Engagement Outcomes

Theme	Comments Raised	Project Response
Land acquisition, land loss and livelihoods	<ul style="list-style-type: none"> The community wanted to understand where the transmission lines route and how they will be affected? Community enquired what will happen to the livestock which grazes in some parts of the Project site. Where will the construction team for the Project be sourcing water for use/drinking? Will farmers be compensated for the construction of the transmission line? 	<ul style="list-style-type: none"> It was explained that a 30 m wayleave will be established where the transmission lines will pass. No farming activities will be allowed along the wayleave. The Project site will be fenced as such no livestock will be able to graze on the Project site. New boreholes will be constructed for Project use. An investigation into groundwater availability will be done prior to construction the boreholes. In addition, water and sanitation forms part of the CSR study. (Refer to <i>Section 9.4</i> Groundwater) Farmers along the transmission line will be compensated for land lost as a result of the Project (Refer to <i>Section 9.7 - Land Acquisition and Displacement</i>)
Community health, safety and security	<ul style="list-style-type: none"> What are the possible health hazards, specifically from dust and waste? Will people be asked to move from their current location and be resettled to another area because of dust? Will there be safety signs along, near or within the Project site? How will the Project ensure women are not going to be raped (safety from sexual abuse and GBV from the Project staff, even their husbands in the homes)? Men tend to abuse women when they are empowered economically through such works; hence, the fear by women. How will the Project contain the diseases that maybe caused or may result from the Project? 	<ul style="list-style-type: none"> Refer to <i>Sections 9.13</i> (Waste), <i>Section 9.7</i> (Land Acquisition and Displacement), <i>Section 9.10</i> (STIs/JHIV), <i>Section 9.11</i> (Community Safety and Security) <i>Section 9.13</i> (Waste) The Project will establish a Grievance Mechanism for all issues related to or caused by the Project. Sensitization campaigns will also be conducted in all the affected communities. Additionally, the Project employers will also emphasize on code of conduct for all its workers, stressing the unacceptable nature of GBV and any form of sexual abuses.
Employment and the economy	<ul style="list-style-type: none"> Will the Project create job opportunities for the community members? All labour should be hired in line with Malawian labour laws. 	<ul style="list-style-type: none"> Refer to <i>Section 8.2 - Employment and the Economy</i>
Community investment/ community expectations	<ul style="list-style-type: none"> Will communities benefit from the electrification program? 	<ul style="list-style-type: none"> The electricity that will be generated from the Project will be fed into the national grid. Therefore there will be no direct connections from the Project into the communities. However, the Project will implement a CSR program which will directly benefit the affected communities.

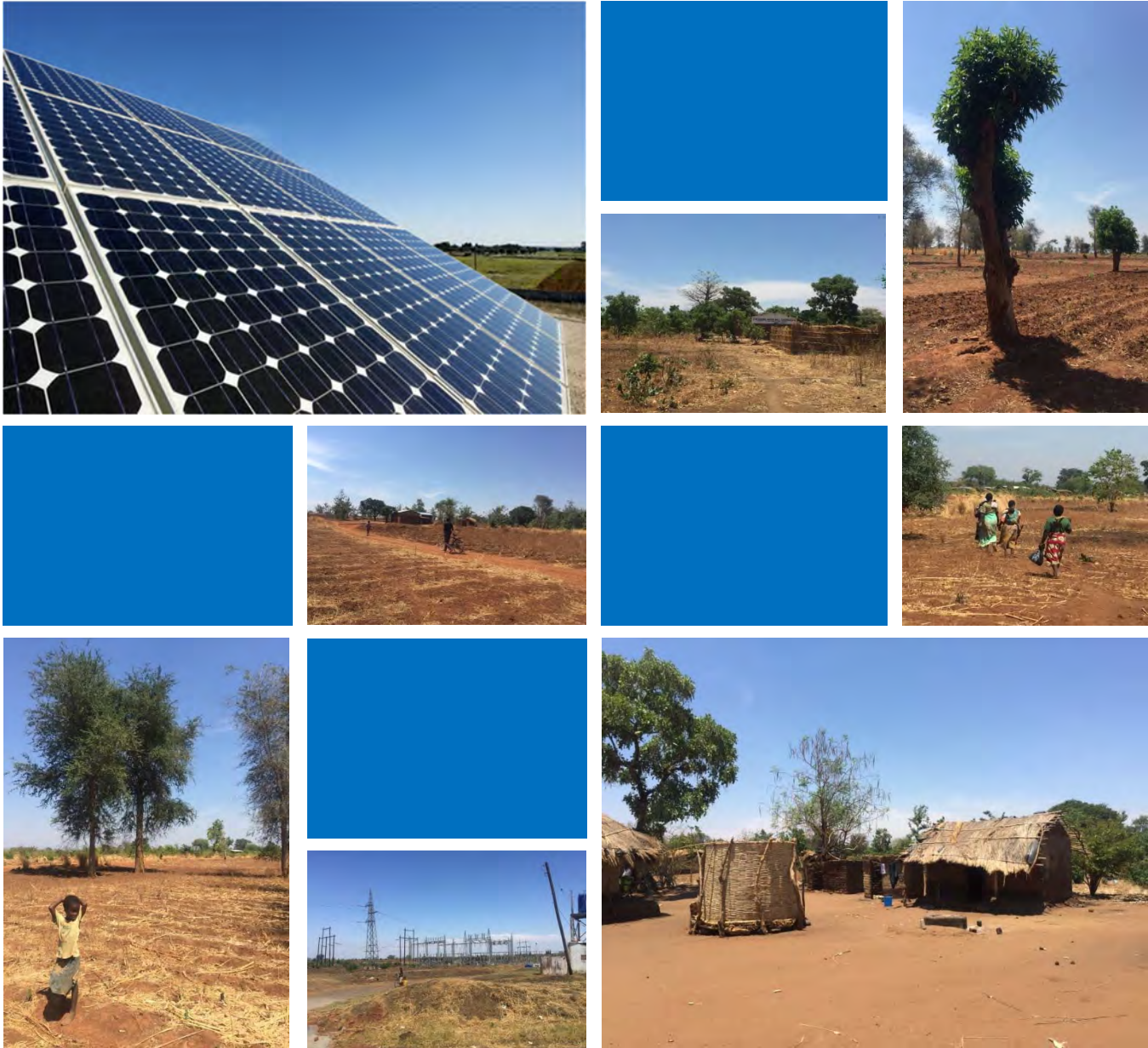


Figure 1.3 *Photos of Community Meetings*

Photos: Left - Nanjoka Community Meeting

Right- Mayambo Community Meeting

Stakeholder Engagement Plan



ProjectCo

Stakeholder Engagement Plan

July 2018

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List of Acronyms

EGENCO	Electricity Generation Company of Malawi
EIA	Environmental Impact Assessment
ESCOM	Electricity Supply Corporation
ESIA	Environmental and Social Impact Assessment
ERM	Environmental Resources Management
EPs	Equator Principles
FGD	Focus Group Discussion
GM	Grievance Mechanism
HH	Household
KII	Key Informant Interview
IFC	International Finance Cooperation
IFI	International Finance Institution
JCM	JCM Matswani Solar Corp Limited
MW	Megawatts
MERA	Malawi Energy Regulatory Authority
NGO	Non-Governmental Organisation
PS	Performance Standards
SEP	Stakeholder Engagement Plan
TA	Traditional Authority
GVH	Group Village Headman

1.1 CONTEXT AND PURPOSE OF THE SEP

JCM Matswani Solar Corp Limited (JCM) (a limited liability corporation in Malawi owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited, and Matswani Capital (PTY) Limited) (herein referred to as 'ProjectCo'). The ProjectCo are planning to develop a 40 megawatt (MW) solar photovoltaic (PV) plant ('the Project') on a 168 hectare (ha) land plot in Salima District situated in the Central Region of Malawi. ProjectCo have agreed on form of Power Purchase Agreement (PPA) with the Electricity Supply Corporation of Malawi Limited (ESCOM) and the power from the Project will be fed directly into the national grid via a short 132 kilovolt (kV) transmission line through to the Salima substation.

This Stakeholder Engagement Plan (SEP) provides a framework to guide the consultation process for the Project, ensuring a two-way process of communication between the developer and stakeholders that may be impacted by the project, influence project decisions, or have a specific interest in the project (e.g. non-governmental organisations) or academic institutions). This version of the SEP is the 3rd iteration since it was originally developed in January 2018.

Key objectives of stakeholder engagement include the following:

Box 1.1

Guiding Principles of Stakeholder Engagement

Ensuring understanding: Provide an inclusive and transparent process of culturally appropriate engagement and communication to ensure that stakeholders are well informed about the planned project.

Build relationships: Through supporting open dialogue, engagement will help establish and maintain a productive relationship between the developed and project affected communities, as well as other key stakeholders.

Facilitate participation: Ensure that all stakeholders participate in decision making regarding the project, regardless of gender, age, ethnicity, status and other socio-economic factors so that they are not adversely impacted and access project benefits.

Engage vulnerable groups: Identify and engage vulnerable groups to enable equal access to project information and a platform for them voice their concerns so that specific measures are included in project design.

Manage expectations: It is important to ensure that the planned project does not create or allow unrealistic expectations to develop amongst stakeholders about potential benefits, such as employment or compensation. The engagement process will serve as a mechanism for understanding and managing expectations by disseminating the correct information in an accessible way.

Ensure compliance: The process is designed to ensure compliance with both local regulatory requirements and international best practice.

Facilitate free, prior and informed consultation: Ensure engagement is free of external manipulation or coercion or intimidation, undertaken in a timely way so that stakeholders are informed prior to the development or implementation of the project, and ensure information is presented in an understandable and accessible way with consideration for literacy and language.

The purpose of the SEP is to provide a framework for managing stakeholder relations to minimise social risk, and to enhance relationships between the developer and Project affected communities.

The SEP has the following objectives:

- To provide a practical framework for engagement with stakeholders during the ESIA process, in compliance with national and international standards.
- To provide a methodology for identifying and mapping key stakeholders based on their level of impact, influence and interest in the Project, including vulnerable groups (eg. female-headed households, elderly, youth, subsistence farmers).
- To help maintain and enhance the Project's social license to operate by ensuring two-way inclusive communication between the developer and stakeholder groups through engagement that is culturally appropriate with consideration for language and gender.
- To provide an effective and accessible mechanism for reporting and managing grievances.
- To define the roles and responsibilities of those involved in managing stakeholder engagement as well as provide a basis for reporting and monitoring engagement activities during each stage of the Project.

This SEP has been prepared in line with national legislation and international standards including the International Finance Corporation (IFC) standards. It is a "living" document that will be updated as the Project evolves. As such it will be updated as the Project progresses.

1.2

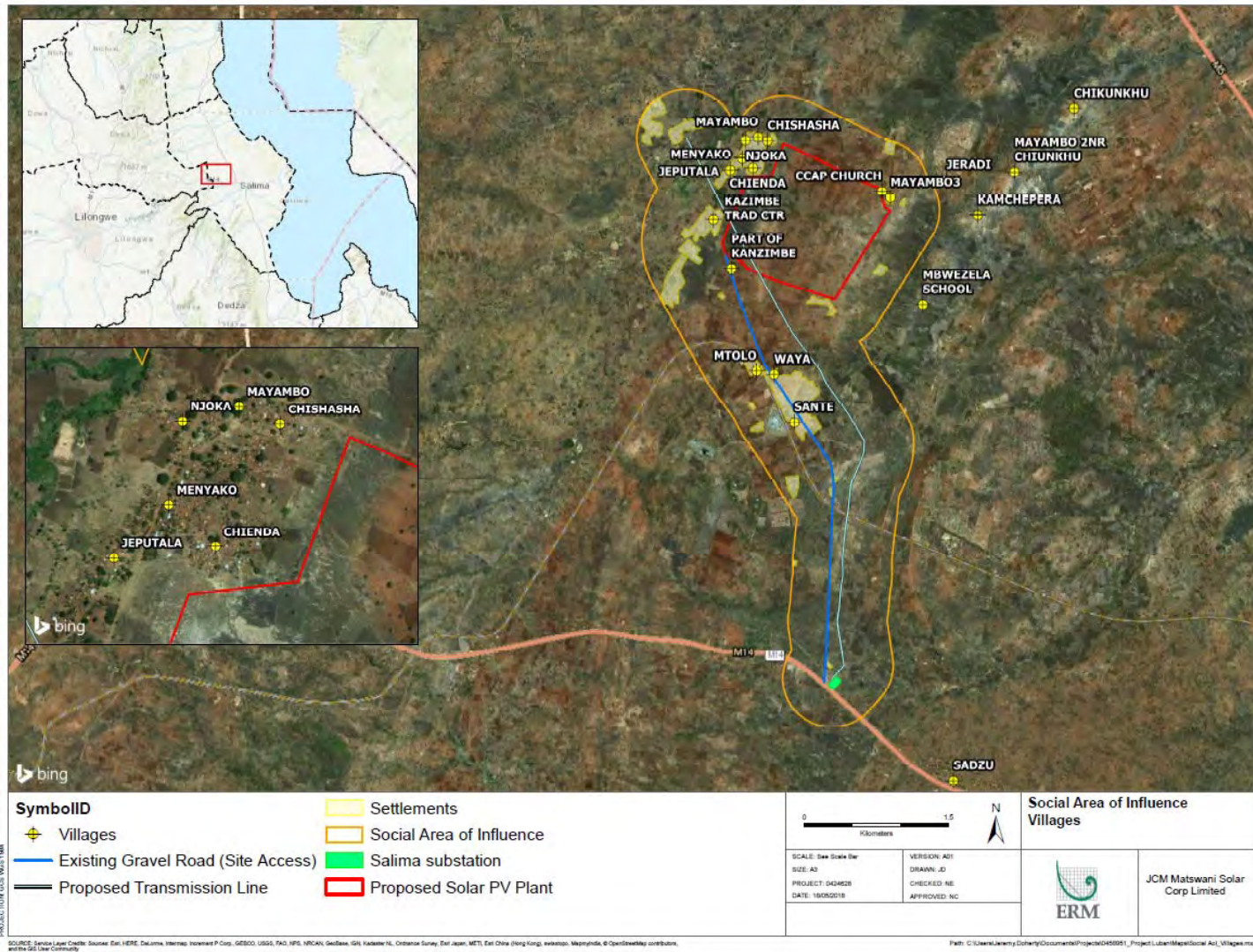
PROJECT OVERVIEW AND SITE CONTEXT

The Project comprises of a 40 megawatt (MW) solar photovoltaic (PV) plant on a 168 ha greenfield site in Kalonga Traditional Authority (TA), Salima District. It is adjacent to the villages of Kanzimbe and Mayambo, under Kanzimbe Group Village (KGV), 20 km from the town of Salima and 88 km from Lilongwe (along on the M5 and M14 roads)

The solar plant will connect to a 132 kV transmission line that runs alongside an existing Electricity Supply Corporation of Malawi (ESCOM) 66 kV transmission line to the Salima substation. Electricity generated will be sold to

ESCOM and will be transferred to the national grid via the existing ESCOM Salima substation. *Figure 1.1* shows the location of the site.

Figure 1.1 Site Location Map



The land acquisition for the Project has been undertaken in two phases. Phase I refers to an initial 80 ha plot of land (government-led land acquisition process already completed) and Phase II refers to additional 88 ha plot of land (land acquisition process in progress). The land acquisition process for Phase I was led by the Salima District Office and undertaken at the end of 2017, prior to the development of the ESIA, in which 72 households were compensated. At the time of writing this SEP, the land acquisition process for additional land was in progress by international consultancy, *Environmental Resources Management (ERM)* in collaboration with *Waste, Water and Environment Consultancy (WWEC)* based in Lilongwe, Malawi.

Additionally, ERM has also undertaken a Land Acquisition and Compensation Specialist (LACS) scope of work (SoW) (herein referred to as 'LACS studies'), for Phase I of land acquisition, to identify measures to align the government-led land acquisition process with international requirements. This included developing an overarching Stakeholder Engagement Plan (SEP) to facilitate communications regarding the Project, ongoing establishment of a grievance mechanism, and development of a socio-economic baseline to monitor the impacts of the land acquisition process and to identify impacts to inform this ESIA. Furthermore, ERM undertook Corporate Social Responsibility (CSR) feasibility studies, which included a community needs assessment and engagement on potential community investment options (herein referred to as 'CSR studies'). The CSR will form part of the ProjectCo's investment into the affected communities.

Both the LACS and CSR studies, undertaken in January 2018, have included providing information on the Project to communities and gathering feedback to inform the outcomes of the ESIA, which is included in *Section Error! Reference source not found.* of this SEP.

2 NATIONAL AND INTERNATIONAL STAKEHOLDER ENGAGEMENT REQUIREMENTS

2.1 INTRODUCTION

This section provides details of national legislative requirements and international best practice standards, namely the International Finance Corporation (IFC) Performance Standards and Equator Principles.

2.2 NATIONAL REQUIREMENTS

The main stakeholder engagement requirements for development projects are detailed in the Environmental Management Act, 1996 ⁽¹⁾. It states that an Environment Impact Assessment (EIS) should be developed in accordance with the requirements set out in the Act. The requirements include the following engagement activities:

“The EIA shall be open for public inspection provided that no except for the purposes of civil proceedings brought under this Act or under any written relating to the protection and management of the environment or the conservation or sustainable utilization of natural resources.

The Director shall invite written or oral comments from the public thereon, and where necessary may –

- *conduct public hearings at such place or places as the Director deems necessary for purposes of assessing public opinion thereon;*
- *require the developer to redesign the project or to do such other thing as the Director considers desirable taking into account all the relevant environmental concerns highlighted in the environmental impact assessment report, any comments made by the public and the need to achieve the objectives of this Act...”*

Additionally, in relation to land acquisition the following legislation applies, which includes notices to be placed in the *Gazette*:

- *Land Act, 2002*: Land designated for investment purposes shall be published in the *Gazette*.
- *Electricity Act, 2004*: Notice needs to be published in the *Gazette* or in a paper in general circulation. Notices should include the nature of the work and the name and location of the project. Notice will also be provided to the affected person.

(1) The Government of Malawi, Environmental Management Act 1996. Available at <https://www.malawilii.org/mw/legislation/act/1996/6> (Accessed November 2017)

- *Land Acquisition Act, 1970*: Notices will be published in the *Gazette* two months prior to acquisition of the land. If the Minister deems that the land is required urgently then the notice period may be less than two months. If the occupier of the land is absent from Malawi during the notice period, then this will be left with a community representative or an agent.
- *The Customary Land Act, 2016*: In the case that the Minister intends to transfer customary land for public interest, this is announced in the *Gazette* and sent to the land committee containing the details of the land to be transferred. Contradictory to the Land Acquisition Act, the Minister shall give 90 days' notice for the transfer. However it should be noted that the land acquired for the Project was private land and therefore this requirement does not apply.

Other requirements that need to be observed by the Project are grounded in the Constitution of Republic of Malawi (1995) which focuses on human rights and participation of various groups in society such as women, children and the disabled that may be vulnerable to Project impacts. As such vulnerable groups will require specific measures to ensure they are included in stakeholder engagement activities.

2.3 *INTERNATIONAL REQUIREMENTS*

This section outlines international best practice requirements stipulated by the IFC and Equator Principles to align stakeholder engagement activities with International Finance Institution (IFI) requirements.

2.3.1 *IFC Performance Standards*

The IFC defines the objective of stakeholder engagement as being “*the basis for building strong, constructive, and responsive relationships that are essential for the successful management of a project's environmental and social impacts*”⁽¹⁾. The IFC Performance Standards include specific guidance on conducting stakeholder engagement both during the planning phase as well as throughout the Project lifecycle. Stakeholder engagement requirements are contained in *Performance Standard 1: Assessment and Management of Environmental and Social Risks and Impacts*, as summarised in Box 2.1.

Box 2.1 *Performance Standards Requirements for Stakeholder Engagement*

IFC PS1: Assessment and Management of Environmental and Social Risks and Impacts: Stakeholder engagement is an on-going process that may involve, in varying degrees, the following elements: stakeholder analysis and planning, disclosure and dissemination of information, consultation and participation, grievance mechanism, and on-going reporting to Affected Stakeholders.

(1) IFC Performance Standard 1: Environmental and Social Risks and Impacts. Available at http://www.ifc.org/wps/wcm/connect/115482804a0255db96fbffd1a5d13d27/PS_English_2012_Full-Documents.pdf?MOD=AJPERES (accessed November 2017)

Disclosure of relevant project information: Provide affected stakeholders with access to relevant information on: (i) the purpose, nature, and scale of the project; (ii) the duration of proposed project activities; (iii) any risks to and potential impacts on such stakeholders and relevant mitigation measures; (iv) the envisaged stakeholder engagement process; and (v) the grievance mechanism.

Informed Consultation and Participation: Conduct an informed consultation and participation process involving a deep exchange of views and information, and an organized and iterative consultation, leading to the project incorporating into their decision-making process the views of the affected stakeholders on matters that affect them directly, such as the proposed mitigation measures, the sharing of development benefits and opportunities, and implementation issues.

The process should be documented, in particular the measures taken to avoid or minimize risks to and adverse impacts on the affected stakeholders. The stakeholders should be informed about how their concerns have been considered.

External Communications: Implement and maintain a procedure for external communications that includes methods to (i) receive and register external communications from the public; (ii) screen and assess the issues raised and determine how to address them; (iii) provide, track, and document responses, if any; and (iv) adjust the management program, as appropriate. In addition, clients are encouraged to make publicly available periodic reports on their environmental and social sustainability.

Grievance Mechanism for Affected Stakeholders: Establish a grievance mechanism to receive and facilitate resolution of affected stakeholders' concerns and grievances about the client's environmental and social performance.

On-going Reporting to Affected Stakeholders: Provide periodic reports to the affected stakeholders that describe progress with implementation of the project Action Plans on issues that involve on-going risk to or impacts on affected stakeholders and on issues that the consultation process or grievance mechanism have identified as a concern to those stakeholders. After completion of an environmental assessment the consultation and disclosure must continue throughout the life cycle (construction and operation phase) of the project.

Source: IFC Performance Standard 1, January 2012.

PS5 promotes the concept of negotiated settlements to avoid expropriation and the forcible removal of people or land use activities.

2.3.2 *Equator Principles*

Equator Principles III, June 2013 comprise 10 principles which are reflect the IFC performance standards. The most relevant principles in relation to this SEP are:

- Principle 2: Environmental and Social Assessment
- Principle 5: Stakeholder engagement
- Principle 6: Grievance mechanism; and
- Principle 10: Reporting and transparency.

Additional detail regarding the principles can be found at:

<http://www.equator-principles.com/index.php/ep3>

3.1 STAKEHOLDERS

Stakeholders include individuals or groups that may influence or be impacted by the Project, as described in Box 3.1 below.

Box 3.1 *IFC Definition of a Stakeholder*

“Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. Stakeholders may include locally affected communities or individuals and their formal and informal representatives, national or local government authorities, politicians, religious leaders, civil society organizations and groups with special interests, the academic community, or other businesses.” (1)



The level of interest is dependent on a number of factors including level of authority, country and social economic context, cultural and intellectual factors. As such, stakeholder identification and mapping process adopted for the project is based on this approach.

3.2 BASELINE CONTEXT

The stakeholder identification process involves assessing the baseline of the Project Area of Interest (AoI) to determine specific groups within it, including vulnerable groups. It also helps to identify the most appropriate engagement approach and communication method for each group.

Aspects of the baseline context particularly relevant to developing an engagement plan are provided in Box 3.2. The data provided is from ERM social surveys undertaken in January and May 2018.

(1) IFC (2007) Stakeholder Engagement: A Good Practice Handbook for Companies Doing Business in Emerging Markets Available at: http://www.ifc.org/wps/wcm/connect/938f1a0048855805beacfe6a6515bb18/IFC_StakeholderEngagement.pdf?MOD=AJPERES (Accessed 27.03.17)

Population: The approximate population in the Project Area varies between 222 in Santhe to 2,160 in Kanzimbe. Households comprise 5-7 people in each.

Religion, ethnicity and language: The primary religion in the villages is Christianity. Chewa is the primary ethnicity, with Chichewa as the main language spoken.

Vulnerable groups:

- *Women and girls:* Greater lack of financial capital and influence in decision making than men. They also suffer domestic violence and abuse, creating impacts on health (eg mental disabilities, sexually transmitted diseases and physical constraints), as well as and high rates of teenage pregnancy.
- *Female headed households:* Higher levels of poverty than men due to more pressure balancing domestic and livelihood activities.
- *Unemployed male youth/adult men:* Due to financial pressure as their role as the 'bread winner', they are vulnerable to alcoholism and depression.
- *Subsistence households:* High levels of poverty and food insecurity creating significant household pressures and health issues.
- *People over the age of 60:* More limited in terms of their physical ability to engage in livelihood and income generating activities. They also endure high levels of poverty due to low levels on income. Additionally, some may require additional care and support.
- *Orphans:* Rely on carers to take responsibility for their economic situation and general wellbeing. Due to high levels of poverty in the project villages, orphans are more vulnerable to change.

Education and literacy levels: Household surveys undertaken in Kanzimbe and Mayambo as part of the LASC studies suggest that 55% of both males and females over the age of 20 years old in Kanzimbe in households surveyed have completed primary education, 10% of males compared to 7% of females and of males have completed junior secondary school, and only, 2% of both males and females have completed senior secondary school. Only 40% of females and 55% of males are literate. In Mayambo Village, 71% of males and 65% of females have completed primary school, and 4% of males and 6% of females have completed junior secondary school. Female and males literacy levels are almost equal; 53% and 50% respectively in households surveyed. These figures are reflective of other villages in the Project Area.

Primary livelihoods: Farming is the primary livelihood undertaken in the villages, with some people engaging in petty trading and bicycle taxis.

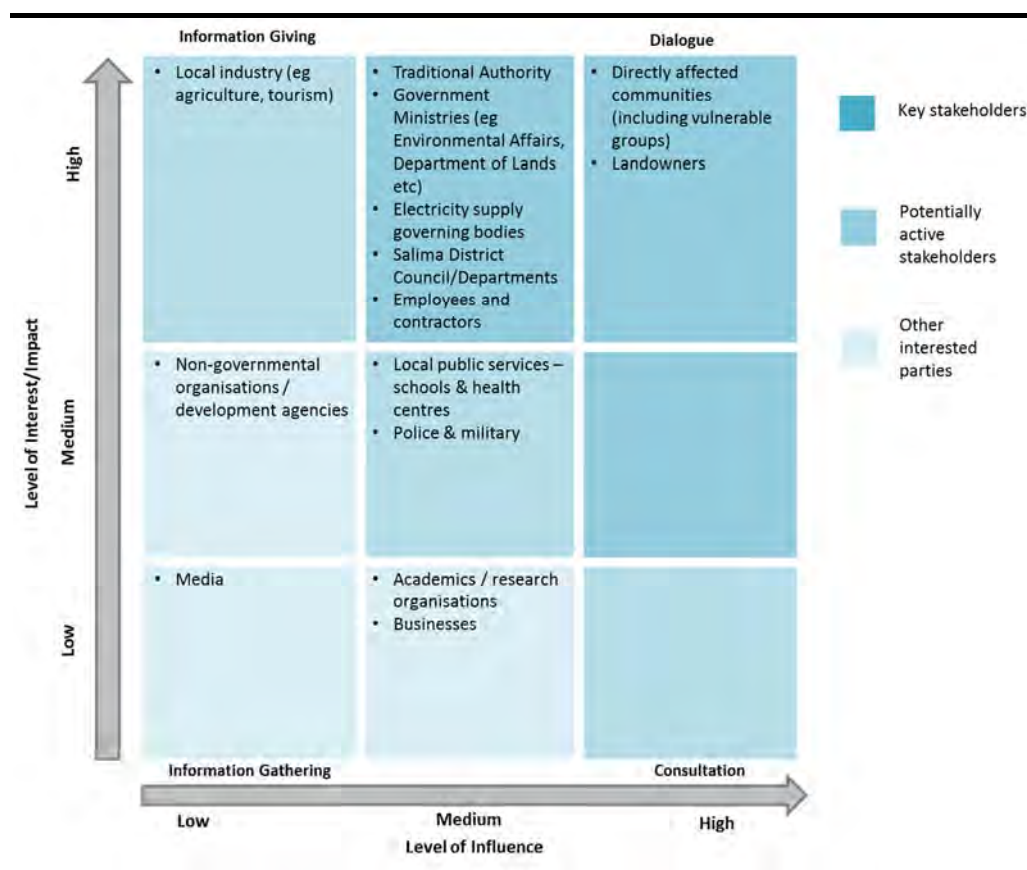
Baseline context also determines specific stakeholder groups and the engagement approach applicable to each, including communication methods included in *Section 4 (Communication Methods)*.

3.3

STAKEHOLDER MAPPING

The aim of stakeholder mapping is to understand the stakeholders' needs and expectations for engagement and consultation in order to tailor engagement to each type of stakeholder. Stakeholders should be categorised and mapped according to their influence, impact and influence of the Project, as shown in *Figure 3.1*.

Figure 3.1 Stakeholder Map



Stakeholder categories include:

- **Key stakeholders:** Stakeholders who have a high level of interest or that will be directly impacted by the project, for example neighbouring communities.
- **Potentially active stakeholders:** Stakeholders that will have a high level of interest or influence on the project, particularly in relation to legal requirements and those that may be indirectly impacted.
- **Other interested parties:** Stakeholders that are likely to voice their opinions and/or concerns but unlikely to experience any impacts from the project.

A list of stakeholders identified to date is provided in *Error! Reference source not found.* This list is not exhaustive and will be updated as the Project progresses.

Table 3.1 *Project Stakeholders*

Stakeholder category	Stakeholder	Connection to the Project
National Regulatory Bodies - National bodies are of primary importance in terms of establishing policy, granting permits and other approvals for the Project and monitoring enforcing compliance.	Department of Environmental Affairs (DoEA)	The Project has to comply with the Environmental and Social Impact Assessment (ESIA) requirements and to develop environmental management and monitoring plans. The Department is responsible for issuing the Environmental Certificate after an ESIA has been approved
	Electricity Supply Corporation (ESCOM)	<p>ESCOM are responsible for the wheeling and distribution of electricity to the consumers.</p> <p>If the affected communities are to benefit from the electricity by way of community investment, ESCOM may have to play a part in the modalities for household connections.</p> <p>Additionally the Project can draw on ESCOM's experience in relation to land acquisition for electricity related projects.</p>
	Department of Lands (LoD)	<p>The ministry (through the Department of Lands) is a key stakeholder in the Project due to the management of land issues in Malawi. The department is the final approving authority for approving land acquisition related matters. It represents the Ministry of Lands, Housing and Urban Development on all matters to do with compensation and resettlement. As such the department has the authority to issue land leases/ registration certificate to ProjectCo.</p> <p>The Ministry also provides land and housing management services to the general public. It draws its mandate from various statutes and policy instruments such as the land acts.</p>
	Electricity Generation Company of Malawi (EGENCO)	EGENCO are currently the sole generators of electricity in Malawi. The contribution of the project to the alleviation energy problems will greatly assist EGENCO.
	Malawi Energy Regulatory Authority (MERA)	MERA is the overall regulatory authority for energy in Malawi.

Stakeholder category	Stakeholder	Connection to the Project
National Government Ministries	Ministry of Gender and Social Welfare (MoGSW)	MoGSW has an interest in the social welfare of the people throughout the country. Therefore, they will be interested in how the Project is managing impacts on vulnerable groups, including women.
	Ministry of Education, Science and Technology (MoEST)	MoEST will be interested in any access related constraints resulting from the Project as well as any skills training and education related community investment that the Project may engage in.
	Local Government and Rural Development (LGRD)	LGRD is that the administration is the link between the Project and the communities' communication and consultation shall be done through the Malawian authority.
	Finance, Economic Planning and Development Department (FEPDD)	Formulates economic fiscal policy and manage financial material resources for the Government for Malawi in order to realise balanced and sustainable economic growth to reduce poverty.
	Natural Resources, Energy and Mining Department (NREMD)	The ministry is there to ensure sustainable development, management and utilisation of energy, minerals; and monitoring geo-hazards for socio economic development.
	District Commissioner (DC)	<p>The DC is the overarching local authority for all the development projects being implemented in the district. He is also the authority to issue the project planning Permit (on behalf of the Department of Physical Planning).</p> <p>Additionally, the DC oversees the compensation process for all projects within the District, including payment of compensation and monitoring activities. The DC's office works hand in hand with the Community Development Officer on matters related to social aspects including community mobilisation and sensitisation on such projects.</p>
	Ministry of Irrigation and Water Development/ Water Department (MoIWD)	The Water Department is responsible for provision of water supply services including piped rural water supply schemes and boreholes. The Department will need to be engaged in relation to water use for the project and any water related CSR projects resulting from the Project. . A water abstraction permit will be required from the Water Resources Authority if the Project requires a borehole or abstraction of surface water for construction purposes.
	Ministry of Labour (MoL)	The MoL issues the Workplace Registration Certificate as mandated by the Occupational Safety Health and Welfare Act. It is also responsible for monitoring of workers' health and safety during construction and operation.

Stakeholder category	Stakeholder	Connection to the Project
Community level - including: <ul style="list-style-type: none"> • Kanzimbe • Mayambo • Waya • Santhe • Sadzu 	Project affected communities including residents in surrounding settlement, land owners and users	Households and communities that will be directly or indirectly affected by the proposed project activities. This includes people living in the affected land either by direct land take or by social and environmental impacts.
	Chiefs/Traditional authorities Village heads	Local community leaders act as representatives of their local community. Meeting with Traditional Authorities will follow local practices and be held prior to any wider communication in order to respect the political and social structure.
Vulnerable groups	May include: <ul style="list-style-type: none"> • Women house headed households • Children headed households • Elderly physically or mentally disabled • Youth • Low-income household (dependent with livelihood activities) 	Vulnerable groups may be disproportionately affected by the proposed Project by virtue of socio-economic status or physical abilities and are therefore less resilient to change. A vulnerability assessment will be required for the Project to identify specific vulnerabilities in the Project area.
Civil society groups	Community based organisations (CBOs) and cooperatives	Organisations that may be impacted by the Project or that the Project can work with on livelihood development activities.
Non-Governmental Organisation(NGO)/Institutions/ Academic	Includes international, national and local NGOs covering biodiversity/conservation, human rights, gender and child related issues	NGO and academic institutions are able to influence the success of projects through advocacy and negative media attention. The Project is required to identify and engage relevant NGOs and institutions to keep them informed about the Project. They may also act as a partner in implementing livelihood or community investment programmes.
Commerce and Industry	Local businesses / potential suppliers and contractors	Will be interested in procurement opportunities in relation to the Project. They may also create cumulative impacts, As such the Project is required to identify industries in the local area and aim to collaborate with them where appropriate.

4.1 INTRODUCTION

During engagement activities, a variety of methods will be used to engage with specific groups reflecting their level of authority, social economic context, cultural and intellectual factors such as level of education and literacy.

Although English is the official language in Malawi, Chichewa is the national language spoken by 57% of the population ⁽¹⁾ There are six languages that are spoken in the Salima District. According to 1998 Population and Housing Census (the latest data regarding language), 80% of the people of Salima speak Chichewa, 10% Chiyao, 8% Chitonga, and 2% Chinyanja, Chitumbuka and Ngoni ⁽²⁾.

At the time of the 2006 Population and Housing Census, 76.6% of males and 58.8 females between the ages of 15 to 24 were literate ⁽³⁾. This shows that there are clear gender disparities in accessing education. In combination, the distance for children to attend school is problematic. The average travel time for almost 60% of all the schools in seven educational zones is approximately 60 minutes ⁽⁴⁾

4.2 COMMUNICATION METHODS

Figure 4.1 provides an overview of the methods that will be used to disseminate information to stakeholders based on the stakeholders group and literacy levels. Additionally, meetings may be held in a variety of formats to ensure that engagement is inclusive and provides a platform for opinions and concerns to be voiced openly.

Meetings are most likely to be in English in Lilongwe and at the government level in Salima, depending on the level of authority. Meetings in communities and at the local level should primarily be in Chichewa.

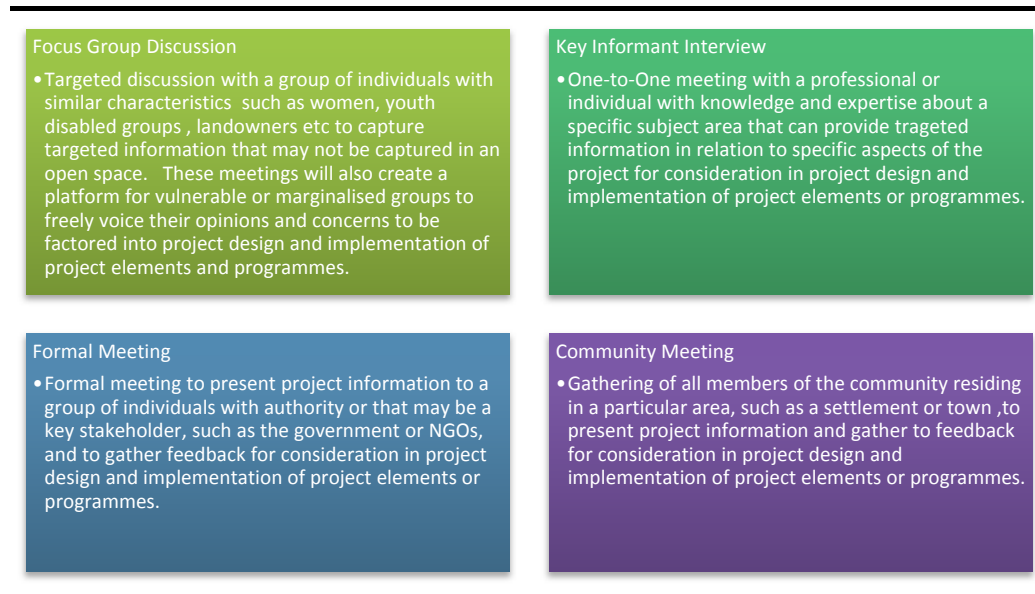
(1) The language spoken in Malawi.-study country.com. Available at <http://www.studycountry.com/guide/MW-language.htm> (accessed November 2017)

(2) Salima District Assembly. Salima Socio-Economic Profile 2006. Available at http://www.malgamw.org/SalimaDistrict_SEP.pdf (accessed November 2017)

(3) Malawi Statistics, 2017. Available at <https://knoema.com/MWMS2011/malawi-statistics-2015?region=1002270-salima&indicator=1003360-literacy-rate> (accessed November 2015)

(4) Salima District Assembly. Salima Socio-Economic Profile 2006. Available at http://www.malgamw.org/SalimaDistrict_SEP.pdf (accessed November 2017)

Figure 4.1 Meeting Formats



The type of meeting held is dependent on the topic area and objectives and therefore should be assessed against these definitions.

Table 4.1 Communication Methods

Tool	Purpose	Stakeholder Groups	Use
PowerPoint presentations	Detailed presentation to provide technical information regarding the Project	<ul style="list-style-type: none"> National regional and local authorities. NGO's Institutions Key Informants/ Professionals 	<ul style="list-style-type: none"> Used at formal meetings
Basic flipbook/pictorial presentation	Presentation of general information regarding the Project	<ul style="list-style-type: none"> Settlements Vulnerable groups 	<ul style="list-style-type: none"> Used at settlement meetings and focus group discussions
Videos	To demonstrate what the Project will look like and how it works in reality	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Can be used at all types of meetings
Flyers/leaflets/background information document	Allows stakeholders to take information home and have a line of contact with ProjectCo should they have any questions.	<ul style="list-style-type: none"> All stakeholder groups 	<ul style="list-style-type: none"> Distributed at meetings and place in accessible public locations (eg community centre, health centre and schools)
Reports and plans	Technical written reports and management plans that present details on potential impacts on the Project and how ProjectCo are managing the environmental and social aspects of the Project to minimise adverse impacts and maximize benefits	<ul style="list-style-type: none"> Government ,professional ,academics and civil society/public 	<ul style="list-style-type: none"> Available online, Project office and public places
Newsletters	Contains information regarding Project developments, employee news, community investment etc	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Available at Project offices and public places
Internet	Provides general detail regarding Project development	<ul style="list-style-type: none"> All 	<ul style="list-style-type: none"> Global or national access to information
Questions and answer guide	List of most frequently asked questions to be used as guidelines to respond to any question from stakeholders.	<ul style="list-style-type: none"> Internal use by Project staff to align responses to questions. Can also be accessible on the Project website if appropriate 	<ul style="list-style-type: none"> Available online if appropriate.

Tool	Purpose	Stakeholder Groups	Use
Media - Television and radio advertising	A short television and radio advertisement on local television or radio channel to disseminate information Project information and details of meetings.	<ul style="list-style-type: none"> • All 	<ul style="list-style-type: none"> • National or local dissemination of information
Posters	Announce the date/ time and venue of meeting	<ul style="list-style-type: none"> • All 	<ul style="list-style-type: none"> • In central locations within settlements or in public places
Meeting evaluation	Process to gather information to evaluate the success of meetings and collect further feedback / comments not collected during the meeting	<ul style="list-style-type: none"> • All 	<ul style="list-style-type: none"> • For literate groups feedback can be provided using a meeting feedback form (see <i>Section 8</i> (monitoring) after meeting • For illiterate groups, this can be done verbally or by using creative methods such as pictorial methods or verbally.

5.1 INTRODUCTION

This section sets out the various key stages of engagement that are required throughout the life of the Project.

5.1.1 *Engagement Background*

Stakeholder engagement undertaken in support of the Project so far has primarily been related Phase I of the land acquisition process, and was undertaken by the Salima District Commissioner. However, other engagement has been in relation to the LACS and CSR studies and included initial engagement to gather information on the land acquisition process undertaken for Phase I and feedback on the Project, as detailed below.

Initial Engagement

Initial engagement involved meeting Regional and District Lands Officers to gather information on the land acquisition and compensation process in Malawi, and in relation to the Project. Additionally, meetings were held with community leaders and representatives of compensation beneficiaries.

A summary of meetings held in relation to initial engagement, including feedback regarding the first phase of land acquisition is provided in *Table 5.1*

Table 5.1 Initial Engagement

Date	Stakeholder	Summary of Points Raised for Consideration in the ESIA and Land Acquisition Process
13/11/17	Mr Sikoti - Representative from the lands office that was involved in the LA process	<ul style="list-style-type: none"> • Explained that all displacement was economic with the exception of one household, which was the Kanzimbe Group Village Headman who was physically displaced. • Recognition of the gaps in relation to the process against the IFC. As there are limited resources to address requirements beyond those required by Malawi law
13/11/17	Regional Lands Commissioner, Lilongwe	<ul style="list-style-type: none"> • Stated that new land laws have been prepared and will be gazetted in 2018.
14/11/17	Salima District Commissioner and the District Lands Officer	<ul style="list-style-type: none"> • There is no formal process of identifying vulnerable groups in Malawi and more needs to be done regarding this. • The Project could support with income generation activities including business training and outgrowers schemes.
14/11/17	Meeting with community representatives and chiefs in Kanzimbe Village	<ul style="list-style-type: none"> • Explained that the community understands the Project. • Confirmed that the Senior Chiefs house was the only house that was relocated. • The community were required to find their own replacement land for farming. • Positive feedback regarding the compensation received and how the compensation was spent. • Stated that 5 people opened bank accounts. • Request from the women to help establish a women's group for small business and microcredit. • Asked if they could still cultivate the land that was acquired. The ProjectCo representative gave approval for this, but highlighted that they will need to stop using the land prior to construction and that no more compensation will be distributed. • Also asked about employment and the Project schedule.
15/11/17	Kalonga Traditional Authority	<ul style="list-style-type: none"> • So far, the TA is pleased with Project progress and feels that it has been more beneficial to affected people and to the Project itself as the compensation has helped improve lives.

Social Baseline Engagement for LACS and CSR Studies

As part of the data gathering process for LACS, communities and stakeholders were provided with an overview of the Project and asked if they had heard about it previously. Additionally, information was gathered regarding perceptions on potential Project impacts.

Most stakeholders met during the social surveys reported that they had heard about the Project; however mainly from people that had received compensation from loss of land.

Women in Kanzimbe had incorrectly understood that the Project is being undertaken to supply power in the village resulting from the current lack of ESCOM power/ electricity, when it will be supplied directly to the national grid. In Mayambo, women said that they had been informed about the Project by the government. Men in Kanzimbe and Mayambo stated that they felt they had a good understanding of the Project and mainly heard about it through land valuers. The teacher at Namanda Primary School stated that information regarding the Project had been informally communicated and that they did not have sufficient understanding of the Project.

A summary of the key issues raised is provided in *Table 5.2* below. This feedback has informed the initial scoping of potential impacts that have been considered in the ESIA.

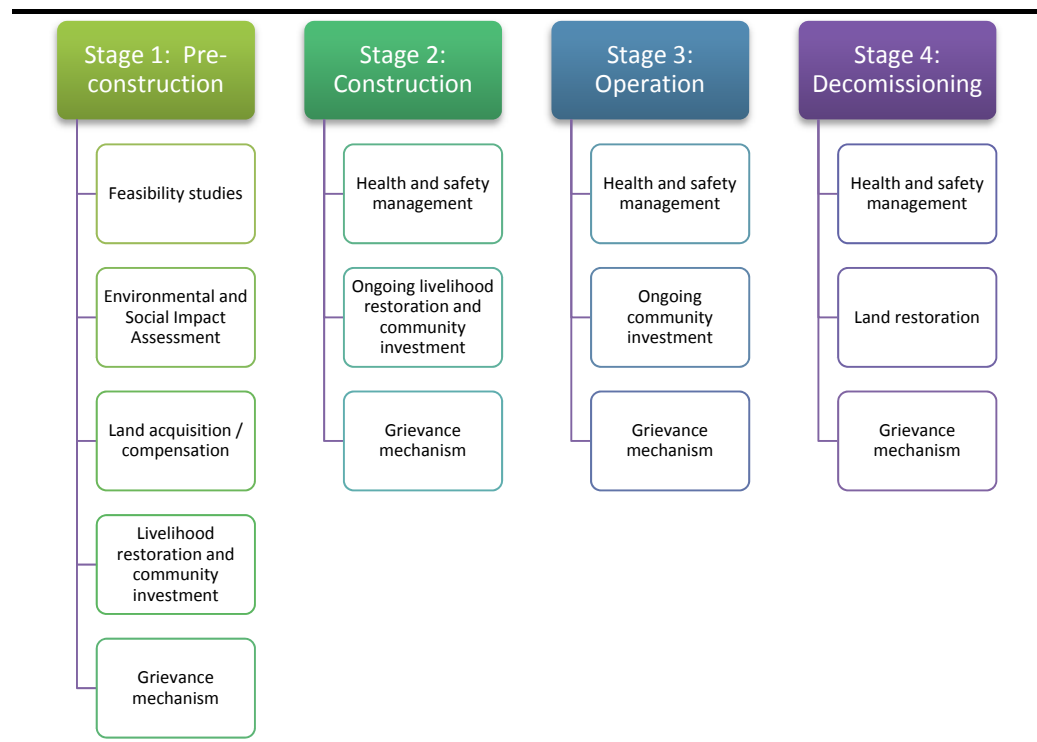
Table 5.2 *Project Feedback and Perceptions*

Topic	Perceptions	Project Response/ESIA Reference
Job creation / economic improvements	<ul style="list-style-type: none"> • Parents will be hired as casual labourers and thus be able to raise some money to provide for the learning needs of their children, including uniforms and books. • Provision of job opportunities, mainly for unskilled labourers in the community, which would help improve the economic situation of households. • Increased sale of produce resulting in increased income generation for traders at Kanzimbe Trading Centre resulting from the presence of the Project workforce. 	<ul style="list-style-type: none"> • Refer to <i>Section 8.2</i> (Employment and the Economy)
Land take	<ul style="list-style-type: none"> • Fear that the Project may require additional land affecting Kanzimbe Trading Centre and farmland. 	<ul style="list-style-type: none"> • At the time of this engagement additional land for the Project was required and has since been surveyed as part of the LRP.
Environmental impacts	<ul style="list-style-type: none"> • Air pollution resulting from construction activities. • Construction of a protected Project waste disposal site, away from schools is required. 	<ul style="list-style-type: none"> • Refer to <i>Section 9.1</i> (Air Quality) • Refer to <i>Section 9.13</i> (Unplanned Events)
Access to power	<ul style="list-style-type: none"> • Access to power will reduce deforestation and reduce the impact of climate change. • Increased study time for students and improved school grades resulting from access to power. • Possibility for solar energy to be connected to Kanzimbe Trading Centre enhancing business opportunities eg mobile phone charging. • Access to power will improve livelihoods • Access to power for lighting. 	<ul style="list-style-type: none"> • It will be up to ESCOM to connect the communities to the national grid, however ProjectCo is intending to undertake community investment activities that include rural electrification. The scope is this is yet to be determined.
Safety and security	<ul style="list-style-type: none"> • Increased theft. • Ensure the site is well secured to reduce incidences of theft. 	<ul style="list-style-type: none"> • Refer to <i>Section 9.11</i> (Community Safety and Security)
Gender - female	<ul style="list-style-type: none"> • Risk for girls to be enticed by male workers. For example, a small irrigation development led to a number of girls dropping out of school due to pregnancies. • Females engaging in sex work to support income generation resulting from parents advising older girls to fend look after themselves. • Marriage breakdowns from polygamy or marital affairs with the workforce and aspiration for improved living standards • The skilled female workforce could act as mentors for girls in the community to complete their education. 	<ul style="list-style-type: none"> • Refer to <i>Sections 9.11</i> (Impacts in STI/HIV transmission and Community Safety and Security)
Gender - male	<ul style="list-style-type: none"> • Men have become more mobile from the cash from the selling of land and drinking is on increase. Sensitisation is needed 	<ul style="list-style-type: none"> • The LRP process will include development of an eligibility and entitlements matrix that will include like-for-like compensation to prevent mis-use of cash compensation.

Topic	Perceptions	Project Response/ESIA Reference
Health	<ul style="list-style-type: none"> • Increased spread of HIV resulting from influx and the presence of the workforce. • Sensitisation is required in schools and in the communities regarding sexual health, involving key decision makers and community change agents. • Increase in respiratory illness from dust during construction. Spraying of water on the roads is required to mitigate dust emissions. • Distribution of condoms in communities, schools and to the Project workforce. • Unwanted pregnancies, breaking up of families and spread of sexually transmitted diseases and HIV/AIDS resulting from interaction with the workforce. 	<ul style="list-style-type: none"> • Refer to <i>Sections 9.11</i> (Impacts in STI/HIV transmission and Community Safety and Security)
Stakeholder Engagement	<ul style="list-style-type: none"> • Direct engagement with Project affected communities rather than through the government or chiefs in order to keep informed about developments and to participate in decision-making. 	<ul style="list-style-type: none"> • Refer to <i>Annex D</i> (Stakeholder Engagement Plan)
Positive comments	<ul style="list-style-type: none"> • The Project will contribute to improving the livelihoods of the community. • The Project is a welcome development that will bring benefits to the community and surrounding areas. • Use of cleaner and renewable energy. • The site will enable Namanda Primary School to have access to a learning site for their renewable energy class. 	<ul style="list-style-type: none"> • Benefits will be considered in the development of a Community Investment Plan based on CSR Feasibility Studies undertaken by ERM in January 2018 that ProjectCo will develop at a later stage, with elements incorporated into the LRP.

Figure 5.1 shows four key stages of engagement that are required throughout the life of the Project. Within each of the stages are specific topic areas that need to be covered. It is however important to recognise that stakeholder engagement is an ongoing process of communication in order to build relationships and creating benefits for both the Project and affected communities. Therefore, meetings beyond these activities may be required to ensure that stakeholders, in particular affected communities are kept informed about Project developments.

Figure 5.1 *Stages of Engagement*



A description of the stages of engagement are provided below.

5.2.1 *Stage 1: Pre-construction*

The pre-construction stage is key to obtaining a social licence to operate and includes a number of engagement activities. At this stage it is also very important to understand who the stakeholders are and their relationship with the Project. It should be noted that land acquisition would normally be included in this stage but as this has already been undertaken is not included.

- **Feasibility studies:** At the early stage of the Project, feasibility studies should include consultations with the Traditional Authority, chiefs/headmen and representatives that are responsible for affected communities to understand the key risks and sensitivities that the Project needs to consider from an impact and cost perspective. At this stage it is

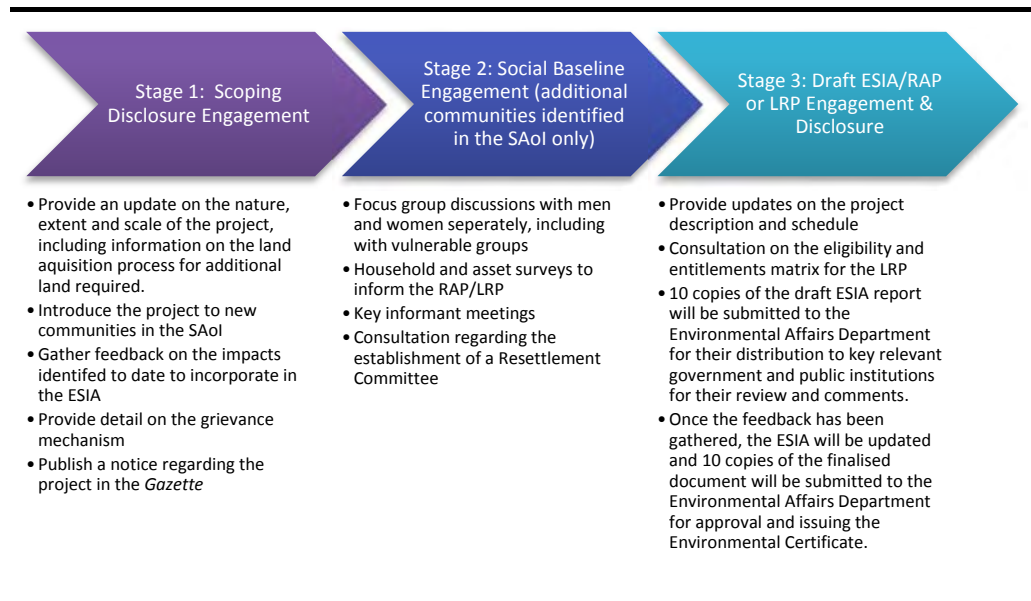
also important to understand perceptions regarding land acquisition and if this is possible.

- **Environmental and Social Impact Assessment:** The ESIA is required by the government to obtain a permit for the Project. It is also a key requirement of the IFC. At the time of writing this SEP the ESIA was in progress. Details of the engagement process in relation to the ESIA are below.
- **Livelihood restoration/community investment:** As a result of economic displacement, to mitigate negative impacts and deliver development benefits a gender focused livelihood restoration programme is required. This includes development of livelihoods programming in collaboration with affected communities, chiefs, local government and other key stakeholders. This will ensure that they participate in the decision making process regarding priorities, needs and feasibility of such programmes. Additionally communities should be active in deciding what investment activities the Project should engage in as well as take responsibility for ownership and implementation with the support of specialist organisations. This engagement is also in progress as a LRP for the Project is being developed.
- **Grievance mechanism:** A grievance mechanism should be established at this stage of the Project to provide an accessible and culturally appropriate platform for stakeholders to express any grievances and provide comments / suggestions regarding the development. A grievance mechanism is provided in *Section 6* of this SEP.

ESIA and LRP Stakeholder Engagement Process

In order to avoid stakeholder fatigue there are three main stages of engagement that form the ESIA and LRP process. These include engaging on the draft scoping report, which incorporates feedback already captured, as well as presenting the Project and gathering feedback from additional communities in the social AoI. Additionally, a third stage of engagement will be undertaken on the draft ESIA/LRP or LRP/ disclosure, which will include consultation on the impacts and associated mitigation identified. Engagement for the ESIA process is presented in *Figure 5.2* below.

Figure 5.2 ESIA and RAP/LRP Engagement



Stage 1 and 2 of the engagement process has been undertaken and details regarding these are provided below. At the time of writing the ESIA, Stage 3 was pending.

Stages 1 and 2: Scoping Disclosure Engagement, and Social Baseline Engagement – Activities and Outcomes

Stage 1 of the engagement process was carried out between the 23rd and the 27th of April 2018, and Stage 2 carried out between 29th May to 02 June 2018. Stage 1 included meeting with national, district, and local level stakeholders, building on from engagement that has already been undertaken in support of the Project.

Engagement materials developed for this stage of engagement included the following;

- Background information document in English and Chichewa to provide a high level overview of the Project, impacts and contact details for comments/grievances to be submitted;
- Flyers for the meeting in Chichewa were posted in affected communities.
- A pictorial community presentation that illustrated the Project footprint, potential impacts, ESIA and land acquisition process, and provided contact details for comments/grievances to be submitted;
- A technical presentation for the government, NGOs, and other stakeholders; and
- A question and answer guide (Q&A) for community meeting facilitators.

All meetings were documented, including meeting registration, photos and meeting minutes. Additionally, feedback on the meeting process was gathered where appropriate using meeting feedback forms and verbally.

Box 5.1

Meeting Feedback Questions

- Was the meeting useful?
- Was the information presented in a clear manner and do you feel that you have a good understanding of the Project activities and plans?
- Were you able to ask the questions you wanted?
- Was this meeting organised in a way to facilitate your attendance?

Information gathered from the feedback process will help to inform the organisation of future engagements and support monitoring and evaluation requirements, as detailed in the SEP.

Details of the activities and outcomes for this stage of engagement are provided below and the all stakeholder engagement materials and meeting minutes for Stage 1 of engagement are provided in *Appendix A*.

National and District Level Engagement

Using the materials described above the Project team arranged and met with the key government departments that play a role in the Project, for approvals or to provide feedback to feed into the ESIA.

A summary of the engagement is provided in *Table 5.3* and photos of the meetings are provided in below.

Table 5.3 National and District Level Engagement

Date	Stakeholder	Comments Raised	Project/ESIA Reference
23 April 2018	Environmental Affairs Department	<ul style="list-style-type: none"> • The EAD were positive about the Project and indicated that it would align with the government’s climate change management policy and help meet the countries Paris Agreement determined contributions to reduce emissions. • They recommended that the Electricity Generating Company (EGENCO) and the Department of Energy (DOE) should also be consulted; and that the consultant should involve the District Environmental Officer at Salima. • What waste will be generated and how will it be managed? • What is the life cycle of the Project and what will happen at the end of the Project life? 	<ul style="list-style-type: none"> • During construction, the main waste will consist of packaging material, which will be disposed of in designated waste disposal sites as guided by the Salima District Council. Any broken panels or hazardous waste will be disposed of by the contractor, in line with the ESIA recommendations (refer to <i>Section 9.13</i>). • The life cycle of the Project is 20 years. A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility (refer to <i>Section 10.5.6</i>)
23 April 2018	ESCOM	<ul style="list-style-type: none"> • People were compensated for the existing transmission line that runs from the Salima substation through the Project site. • ESCOM confirmed that the wayleave width is 30 meters. • ESCOM emphasised that displacement of people should be avoided 	<ul style="list-style-type: none"> • The comments from the ESCOM will be incorporated into the LRP being developed for the Project (refer to <i>Section 9.7 Land Acquisition and Displacement</i>).
23 April 2018	MERA	<ul style="list-style-type: none"> • Issuing of licenses by MERA to the IPPs is based on the Environmental and Social Impact Assessment (ESIA) approval certificate and acquisition of land according to the national procedures. • MERA does not have an institutional environmental policy. • In reaction to how the communities can benefit from the Project directly (i.e. from the generated electricity) MERA stated that a min- grid framework is being developed and this would provide modalities of how communities can be supplied with electricity from mini-grids. • MERA is concerned with safety on construction sites and therefore the ProjectCo must observe all the relevant safety regulations, both during construction and operation. 	<ul style="list-style-type: none"> • Benefits will be considered in the development of a Community Investment Plan that ProjectCo will develop at a later stage, with elements incorporated into the LRP. • Refer to <i>Sections 9.9 (Vector Borne and Communicable Diseases) 9.9 (Community Safety and Security) and Traffic Impacts Section 9.13</i>

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Department of Labour	<ul style="list-style-type: none"> How many people will be employed? Where will labour be sourced from and what is the balance between local and foreign labour? There will be need to register the construction site with the Ministry of Labour (a licence will have to be issued). An operating licence is also a requirement by the Ministry of Labour Facilities (toilets, water) must be provided to workers. A safety committee must be established where there are more than 50 workers. There will be need to have a fence around the construction site and PPE will have to be provided to the workers. 	<ul style="list-style-type: none"> The majority of people will be required during construction. These will be employed from the local community or Salima Town where possible. Skilled labour may be sourced from outside Salima District. During operation, only a few people will be required to maintain the security of the premises, as the solar panels do not require to be operated by anyone. Refer to Sections 9.6 (Vector Borne and Communicable Diseases) 9.9 (Community Safety and Security), 9.6 (Labour and Working Conditions) and 8.2 (Employment and the Economy)
24 April 2018	Department of Lands	<ul style="list-style-type: none"> When will the Project start and how long will construction take? What will be the affected area? Has a Resettlement Action Plan (RAP) been prepared? 	<ul style="list-style-type: none"> The Project is due to start construction at the beginning of 2019 and construction will take approximately 9 months. The Project site is approximately 168 Ha and the wayleave for the transmission line is 30m wide over 3-4 km. A RAP has not been prepared as it is envisaged that there will not be any people to be resettled; one structure used for economic activities (eg goat farming) was identified during survey undertaken June 2018, however ProjectCo is seeking to divert the transmission line to avoid it. However, a Livelihood Restoration Plan (LRP) will be prepared for those economically displaced (refer to <i>Section 9.7</i> Land Acquisition and Displacement). The LRP will be submitted to the Department of Lands.

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Ministry of Transport and Public Infrastructure	<ul style="list-style-type: none"> • What are the activities that will take place for the road construction? • The Solar farm at Kamuzu International Airport (KIA) has problems of sustainability with rates (tariff). How will this be taken care of for the proposed Project? • Land (farmland) in Salima is an issue. Is the Project intending to provide alternative land? • Solar panels emit infra-red radiation. How close is the nearest habitation? What impacts will there be on birds? • What will happen to the surrounding community? Will they have access to electricity? • Cleaning the solar panels with water will be unethical in a place where potable water is not sufficiently available to the community. How does the Project intend to provide water? 	<ul style="list-style-type: none"> • The existing site access road will be graded as necessary to accommodate the anticipated Project traffic. • The ProjectCo is discussing the tariff with the relevant authorities (not part of the remit of the ESIA). • Benefits will be considered in the development of a Community Investment Plan based on CSR Feasibility Studies undertaken by ERM in January 2018 that ProjectCo will develop at a later stage, with elements incorporated into the LRP. This will potentially include rural electrification, water and sanitation, and agriculture. • The Project is designed to sell electricity to ESCOM and feed directly to the national grid. Hence, the communities in the Project area cannot be connected directly to the solar power plant. • Refer to <i>Sections 9.7 (Land Acquisition and Displacement), Section 9.4 (Groundwater), Sections 9.9 (Vector Borne and Communicable Diseases) 9.11 (Community Safety and Security), 9.5 (Biodiversity)</i>
24 April 2018	Ministry of Agriculture, Irrigation and Water Development	<ul style="list-style-type: none"> • What will what happen to the solar power plan after the 20 years? • The Project will generate up to 40 MW of electricity. The Ministry enquired how many households will be able to connect to this amount of electricity. 	<ul style="list-style-type: none"> • A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility (refer to Section X) • It will be up to ESCOM to decide if any communities will connect to the grid. However, CSR Feasibility Studies were undertaken by ERM in January 2018, which consider rural electrification options. ProjectCo are seeking to undertake community investment at a later stage to enhance community benefits resulting from the Project.

Date	Stakeholder	Comments Raised	Project/ESIA Reference
24 April 2018	Salima District Council	<ul style="list-style-type: none"> • What is the plan for the people who will be displaced? • Will the solar system include batteries? If yes how will the batteries be managed in terms of disposal? • How will the Project be decommissioned after the Project period? • What are the examples of the community investment programs that the Project will implement? • What will be the mitigation measures put in place by the Project to manage waste from the Project site? • Will the Project source water from the community water sources? • How will the Project address visual impacts/glare? • Is there going to be any legal document on the corporate social responsibility between the Project implementers and the communities or district council or the government? • How will the Project ensure women safety from sexual abuse and GBV from the Project staff (even their husbands in the homes? Men tend to abuse women when they are empowered economically through such works; hence the fear from women 	<ul style="list-style-type: none"> • No large scale batteries will be used as part of the Project. • Refer to <i>Section 9.7 (Land Acquisition and Displacement)</i>, <i>Section 9.10 (STIs/JHIV)</i>, <i>Section 9.11 (Community Safety and Security)</i>, <i>Section 9.13 (Waste)</i>, <i>Section 9.4 (Groundwater)</i>, <i>Section 9.6 (Landscape and Visual)</i> • A decommissioning Plan will be developed and implemented prior to closing the Solar PV facility. • A CSR Feasibility study has been completed which focuses on potential investments in agriculture, water and sanitation, and electrification. There is currently no legal document in place for this.
26 April 2018	Ministry of Lands (district)	<ul style="list-style-type: none"> • The meeting's main agenda was to discuss the land acquisition process and how the local process could be aligned with the IFC Standards • No one is forced to sell their land or sign any documents, however the parties enter into negotiations with the land owner • Grievance Committees: these are established in the communities during the consultation meetings to be able to handle any issues that will likely come out of the proposed Project, especially as it relates to land. • There are discrepancies between the IFC/world bank standards and the Malawian regulations when it comes to land acquisition and compensation. 	<ul style="list-style-type: none"> • Refer to <i>Section 9.7 (Land Acquisition and Displacement)</i>, <i>Annex D (Stakeholder Engagement Plan)</i>

Date	Stakeholder	Comments Raised	Project/ESIA Reference
26 April 2018	District Council Environmental Officer	<ul style="list-style-type: none"> • The Project area is largely cultivated. • Licenses are required to cut down certain trees. • No protected areas near the Project Site • Main drivers of environmental degradation include: <ul style="list-style-type: none"> ○ Charcoal burning, and ○ Agricultural and settlement expansion. • Baobabs are threatened in Malawi. Forestry department must be informed prior to clearance of baobabs. • Waste sites are very basic (not lined) and poorly managed. 	<ul style="list-style-type: none"> • Refer to <i>Sections 9.5</i> (Biodiversity), <i>Section 9.13</i> (Waste Management)

Figure 5.3 Photos of National and District Meetings



Photos: Left- ESCOM , Right- Salima District Council Environmental officer

Community Level Engagement

In addition to national and district meetings, meetings were also held with communities covering a number of villages in the Project area. The purpose of the meetings was to provide a more in depth description of the Project that they had received previously, explain the ESIA process, explain some of the key impacts identified during the scoping process and gather feedback to feed into the ESIA. A total of three community meetings were held, representing affected people surrounding the Project Site and along the transmission line wayleave.

Table 5.4 shows the meetings held in each community and the demographics of each meeting. As the figures show, women were well represented in all the meetings held.

Table 5.4 Community Meetings

Date	Location	Villages Represented	Females	Males	Total
24 April 2018	Kanzimbe	Kanzimbe, Kanzimbe 2, Menyako, Maiezi, Mputeni, Jephytala, Malezi	45	40	85
25 April 2018	Mayambo	Mayambo, Njoka, Kanthiti, Chishasha, Kachepela	44	46	100
26 April 2018	Nanjoka	Waya 1, Santhe, Motolo, Sadzu, Malezi, Thangani, Mwape, Malumbula, Michembo, Vonguti, Kuso, Chiwaka	74	54	128
Total			163	140	313

In addition to community meetings, Stage 2 of engagement involved undertaking focus group discussions and key informant interviews were undertaken to gather gender and topic related information. A full list of meetings is provided in *Appendix A*. The outcomes and Project response from

all the meetings is detailed in *Table 5.5* below. Photos of community meetings are provided in *Figure 5.4* below.

Table 5.5 Stage 1 and 2: Community Level Engagement Outcomes

Theme	Comments Raised	Project Response
Land acquisition, land loss and livelihoods	<ul style="list-style-type: none"> The community wanted to understand where the transmission lines route and how they will be affected? Community enquired what will happen to the livestock which grazes in some parts of the Project site. Where will the construction team for the Project be sourcing water for use/drinking? Will farmers be compensated for the construction of the transmission line? 	<ul style="list-style-type: none"> It was explained that a 30 m wayleave will be established where the transmission lines will pass. No farming activities will be allowed along the wayleave. The Project site will be fenced as such no livestock will be able to graze on the Project site. New boreholes will be constructed for Project use. An investigation into groundwater availability will be done prior to construction the boreholes. In addition, water and sanitation forms part of the CSR study. (Refer to <i>Section 9.4</i> Groundwater) Farmers along the transmission line will be compensated for land lost as a result of the Project (Refer to <i>Section 9.7 - Land Acquisition and Displacement</i>)
Community health, safety and security	<ul style="list-style-type: none"> What are the possible health hazards, specifically from dust and waste? Will people be asked to move from their current location and be resettled to another area because of dust? Will there be safety signs along, near or within the Project site? How will the Project ensure women are not going to be raped (safety from sexual abuse and GBV from the Project staff, even their husbands in the homes)? Men tend to abuse women when they are empowered economically through such works; hence, the fear by women. How will the Project contain the diseases that maybe caused or may result from the Project? 	<ul style="list-style-type: none"> Refer to <i>Sections 9.13</i> (Waste), <i>Section 9.7</i> (Land Acquisition and Displacement), <i>Section 9.10</i> (STIs/JHIV), <i>Section 9.11</i> (Community Safety and Security) <i>Section 9.13</i> (Waste) The Project will establish a Grievance Mechanism for all issues related to or caused by the Project. Sensitization campaigns will also be conducted in all the affected communities. Additionally, the Project employers will also emphasize on code of conduct for all its workers, stressing the unacceptable nature of GBV and any form of sexual abuses.
Employment and the economy	<ul style="list-style-type: none"> Will the Project create job opportunities for the community members? All labour should be hired in line with Malawian labour laws. 	<ul style="list-style-type: none"> Refer to <i>Section 8.2 - Employment and the Economy</i>
Community investment/ community expectations	<ul style="list-style-type: none"> Will communities benefit from the electrification program? 	<ul style="list-style-type: none"> The electricity that will be generated from the Project will be fed into the national grid. Therefore there will be no direct connections from the Project into the communities. However, the Project will implement a CSR program which will directly benefit the affected communities.

Figure 5.4 *Photos of Community Meetings*



Photos: Left - Nanjoka Community Meeting, Right- Mayambo Community Meeting

5.2.2 *Stage 2 and 3: Construction and Operation*

Construction phase engagement will be used to monitor the success of the mitigations that have been established for this stage of work, respond to grievances and identify alternative mitigation measures where required.

During this period meetings with the communities shall be held on a regular basis. Meetings will include Project updates, health and safety sensitisation and obtaining feedback regarding the Project and maintenance of the site office.

As operational impacts will be significantly less than construction (mainly visual due to the presence of the solar farm), affected communities will be reviewed to reduce the number meetings to be held on a regular basis. Meetings will include Project updates, health and safety, and obtaining feedback regarding the Project and the grievance process. As the operational phase progresses and the community adjusts to the change in landscape, it is likely that grievances will significantly reduce.

Table 5.6 provides an overview of consultation activities and their frequency during Stages 2 and 3 of consultation.

Table 5.6 *Stages 6 and 7: Construction and Operation Engagement Activities*

Stakeholder Group	Information Requirements	Method of Communication and Frequency	
		Construction	Operation
Government (national, regional, district)	<ul style="list-style-type: none"> Project developments Livelihood restoration/land take issues Other Project approvals Community investment 	Ongoing as required	Ongoing as required
Traditional Authorities	<ul style="list-style-type: none"> Project updates Represent community grievances Community investment 	Monthly meetings	Monthly for the first 6 months, then quarterly.
Directly Affected Communities	<ul style="list-style-type: none"> Project updates Report grievances 	<p>Community meetings in areas where construction is taking place at least two weeks prior to work starting and monthly thereafter.</p> <p>A community liaison/grievance officer shall be based in key construction locations.</p>	<p>Monthly for the first 6 months, then quarterly.</p> <p>Radio updates and flyers shall be disseminated when required.</p>
Community Based Organisations (TBC)	<ul style="list-style-type: none"> Project updates Report grievances 	<p>Updates via the local radio</p> <p>Quarterly dissemination of flyers</p>	Radio updates and flyers shall be disseminated when required
Employees/Contractors	<ul style="list-style-type: none"> Project updates to keep staff engaged in their working environment. Report issues related to labour and working conditions. Management/monitoring of staff grievances. 	<p>Weekly team meetings.</p> <p>Notices posted around the site.</p> <p>Staff newsletters, if applicable.</p>	<p>Weekly meetings for all staff working at the site.</p> <p>Notices posted around the site.</p> <p>Staff newsletters, if applicable</p>
Non-Governmental Organisations	<ul style="list-style-type: none"> Project updates Community investment 	Email updates/newsletter as required.	Email updates/newsletter as required.
Local public services	<ul style="list-style-type: none"> Project updates Report issues related to public service grievances 	Quarterly meetings, with relevant stakeholders.	Email updates/newsletter as required.
Media	<ul style="list-style-type: none"> Project updates 	Email updates/newsletter as required.	Email updates/newsletter as required.

Stakeholder Group	Information Requirements	Method of Communication and Frequency	
		Construction	Operation
Local businesses	<ul style="list-style-type: none"> • Project updates • Management of cumulative impacts 	Quarterly meetings, with relevant stakeholders Updates via the local radio Quarterly dissemination of flyers	Annual meetings Email updates/newsletter as required.
Academics and research institutes	<ul style="list-style-type: none"> • Project updates 	Email updates/newsletter as required.	Email updates/newsletter as required.

5.2.3

Stage 4: Decommissioning

The impacts of decommissioning are not likely to be significant since the operational impacts will be small. However, engagement still needs to be considered as communities will have evolved over the Project lifespan. As such, prior to decommissioning, the developer will prepare a site closure a Site Closure Plan. The Project will consult with stakeholder groups, to ensure that feedback regarding the impacts of decommissioning is considered in the Plan and ensure, among other, that land restoration has been completed.

6.1 OVERVIEW AND PURPOSE

The grievance mechanism is a process that enables stakeholders to communicate their concerns or complaints regarding the way a project is being implemented. This includes ensuring that all grievances that have been received are acknowledged and logged and that the complainant knows what to expect in terms of response and when.

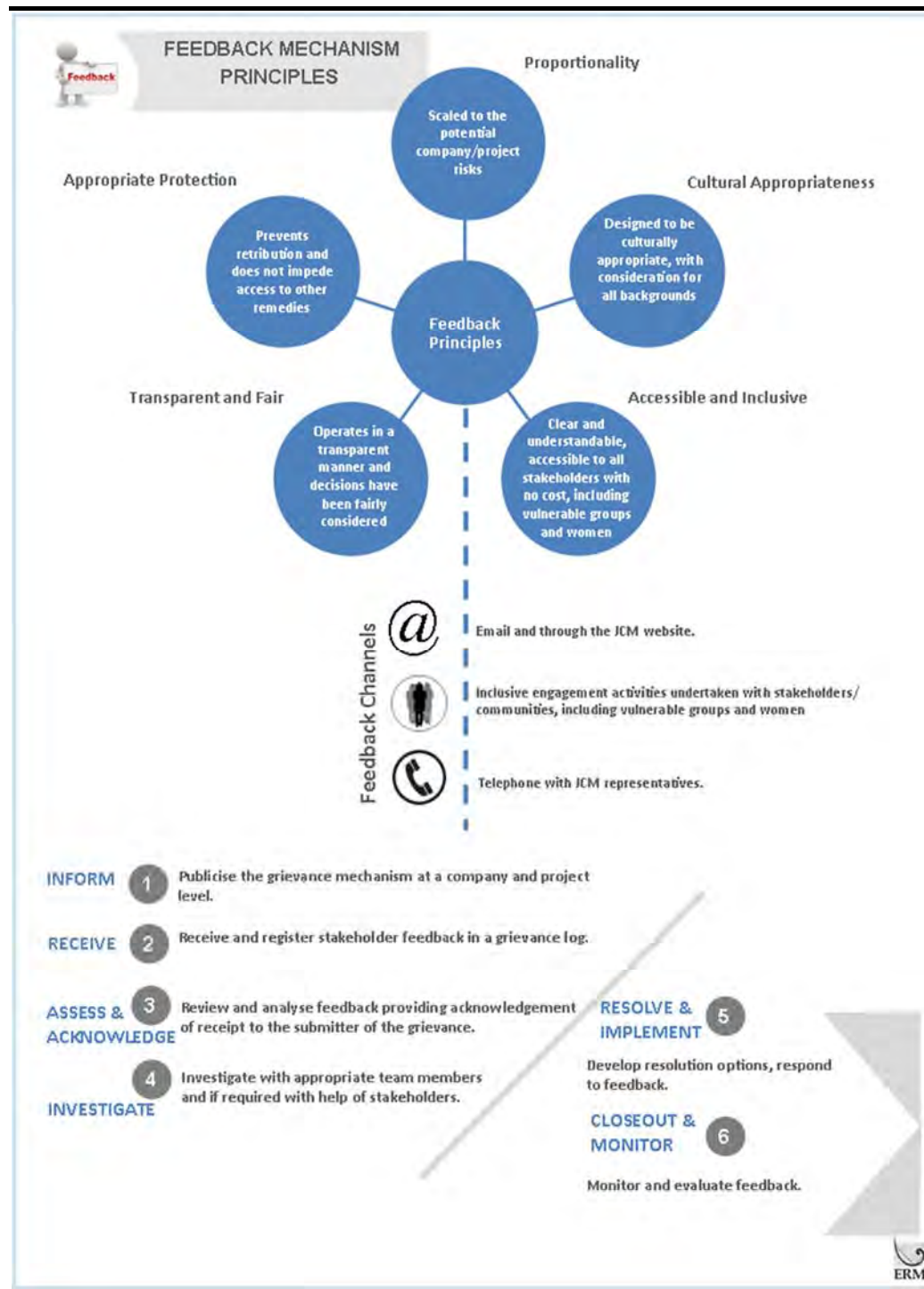
Types of grievances may vary and may be related to injuries / damage, concerns about routine Project activities, perceived incidents or impacts or requests for more information/clarity on Project activities. Ongoing information dissemination and relationship building can significantly minimise the number of grievance raised as well as reduce social risk resulting from the time and budget required to resolve issues at a later stage.

The primary objectives of a grievance mechanism are to:

- enhance trust and positive relationships with stakeholders; and
- identify and manage stakeholder concerns and thus support effective risk management.

The key principles of an effective grievance mechanism is illustrated in *Figure 6.1*.

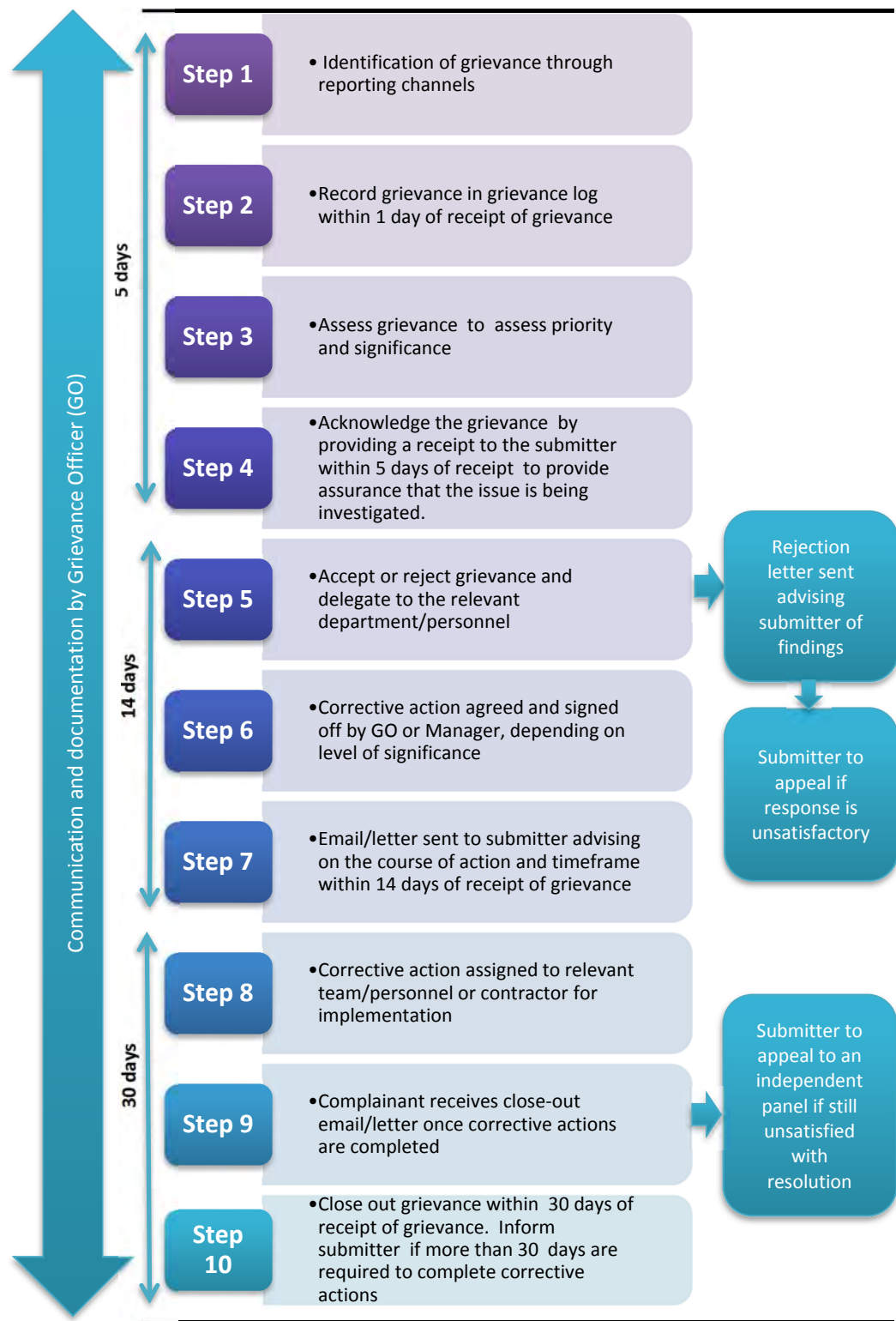
Figure 6.1 Grievance Principles



6.2 GRIEVANCE PROCESS

A formal grievance procedure based on best international practice will be implemented based on the principles detailed above and the process provided in Figure 6.2 below. The grievance mechanism shall be implemented by a Community Liaison Officer (CLO)/Grievance Officer (GO) or similar who will be based at a site office during key Project phases, primarily construction, to ensure that the local community including vulnerable groups are able to easily raise issues.

Figure 6.2 Grievance Process

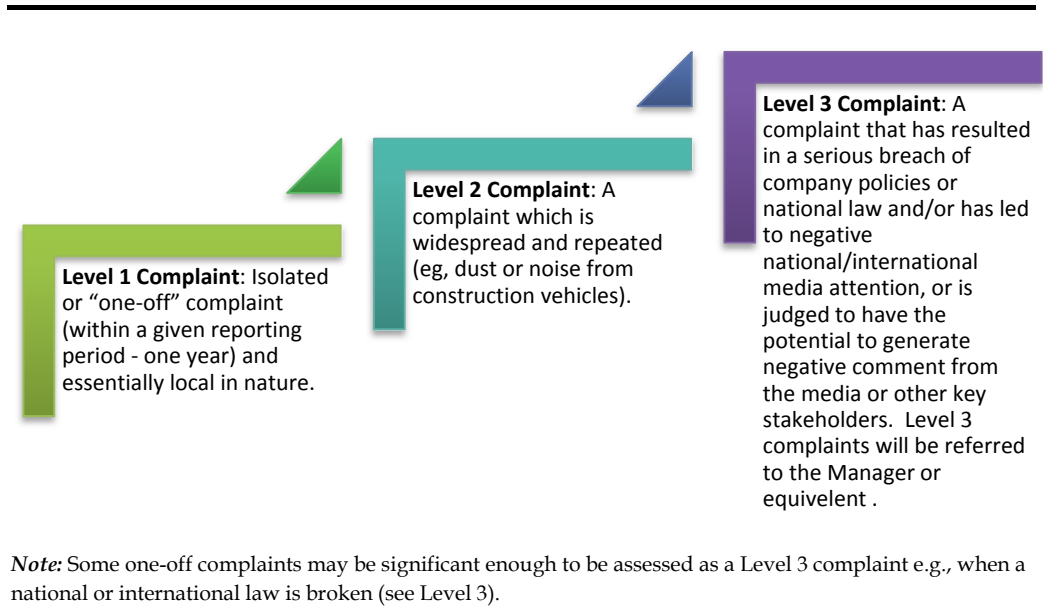


The grievance mechanism will be publicly communicated to affected stakeholders and they will be made aware of the process, their rights to submit grievances, and how the mechanism will function.

Complaints will be submitted to a GO directly via telephone, letters, site offices, and via email where accessible.

On receipt of the grievance the GO will log the complaint in a grievance log. The grievance is then reviewed by the GO who assesses the significance in order to priorities the grievance. The significance criteria are presented in *Figure 6.3*.

Figure 6.3 *Significance Criteria*



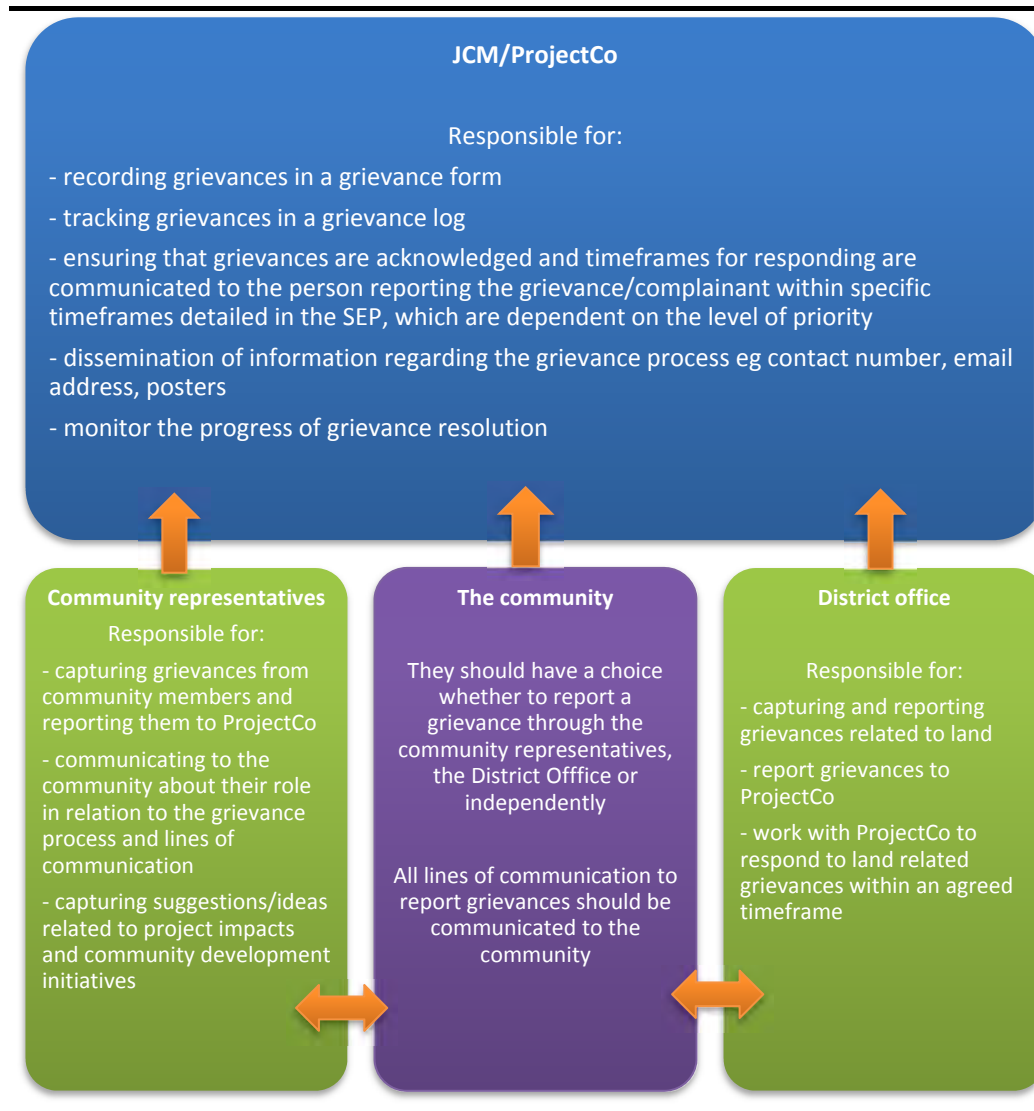
Level 1 and 2 complaints will be managed by the GO. Level 3 complaints will be managed in discussion with the in-country manager.

The submitter will receive a response within five days to confirm acknowledgement of the grievance and provide assurance that it is being dealt with. The grievance will then be accepted or rejected by the developer. If rejected, the complainant will receive details regarding the rejection. If approved, the grievance will be referred to the relevant person to assess options for resolving the issue (eg, environment, site management, engineering, community liaison etc.).

Once the corrective action is decided by the relevant parties, it will be approved and signed off by the GO, or in-country manager or equivalent, if required. The submitter will receive an email/letter within 14 days of submission of the grievance confirming the corrective action to resolve the issue. The relevant parties will then implement the corrective action and aim to close-out the grievance within 30 days of receiving the grievance. The submitter will be informed if there are any delays. The submitter has the right to appeal through the independent panel comprised of key stakeholders such as a lawyer, Project representatives, government and community leaders if they are not satisfied with the resolution of the grievance.

When establishing a grievance process it is important to establish clear roles and responsibilities so that complaints and queries are responded to efficiently, in order to maintain relationships with the community. Below is the model that has been established for managing the grievance process.

Figure 6.4 *Grievance Model*



This SEP will be updated once the grievance committee is formalised.

7.1 PRINCIPLE OF TEAM ORGANISATION

The community relations shall follow the key principles outlined below:

- **Overall responsibility and clear reporting lines:** Clear reporting lines and internal lines of communication will be discussed and agreed with the senior managers to ensure that the team has clear roles and responsibilities.
- **Defined responsibilities of third parties regarding communication :** the role of third parties /contractors in communicating to stakeholders will be clearly defined and regularly monitored to ensure that all interactions and engagement is culturally appropriate, does not exclude stakeholder groups(in particular women, and vulnerable groups), raise false expectation that lead into perceived promises or commitment without obtaining prior agreement.
- **Hire, train and deploy the right personnel:** all staff interacting with stakeholders will be able to develop good working relationships with groups, from government to settlement level, in order to build maintain and trust and cooperation. Criteria of CLOs (or equivalent) engaging with stakeholders on a daily basis will include:
 - National staff from the local areas, fluent in Chichewa;
 - Staff with good communication and listening skills;
 - Open-mindedness and respect for the views of others;
 - Proactive mind-set and good problem solving skills; and
 - Commitment to the position and an understanding of ProjectCo objectives approach to governance.

Training is important to maintain the skills and capacity of the community relations team. This includes communication skills to manage expectations and deliver key messages, and computer literacy to manage and maintain engagement records and grievance logs.

7.1.1 *Community Relation Functions*

Details of core social performance functions in order to manage Project risks and communications are detailed in *Box 7.1*. However as the site is relatively small, ProjectCo will need to consolidate these roles.

Box 7.1 Roles and Responsibilities

Social Performance Manager (developer or project level): Primarily responsible for developing and implementing policies and procedures for managing land acquisition, community engagement, community investment etc. Other responsibilities include

recruitment of key staff, developing and implementing training programmes, monitoring and review of social performance related activities and approval of budgets.

Community Liaison/Engagement Manager: Responsible for managing the in-country Community Liaison Team, ensuring sufficient resources are made available for designated functions and ensuring that the stakeholder engagement process is effective and is being implemented in line with the approach set out in this SEP.

Community Investment/Fund Officer: Primarily responsible for establishing and implementing community investment project based on community needs assessments. This includes maintaining stakeholder relationships with partners for delivery of investment projects, monitoring and evaluation of projects, keeping informed with national and regional priorities, to align investment initiatives with the overall country strategy; and managing investment budgets and timelines.

Community Liaison Officers (or equivalent): Primarily the face of the project responsible for building effective and trusting relationships with stakeholders/communities through regular visits and communication regarding the project in line with this SEP. Other activities include updating stakeholder lists and logging/tracking of activities and reporting grievances to the Grievance Officer and follow up when required.

Grievance Officers (or equivalent): Responsible for dissemination of information regarding the grievance process to ensure that it is widely understood among project affected settlements and logging and resolving grievances in a timely manner, in line with the grievance process and best practice principles. This includes undertaking regular visits to settlements or phone calls with community representatives to encourage use of the grievance process and maintaining a grievance log.

8.1 MONITORING

In order to assess the effectiveness of this SEP and associated engagement activities, ProjectCo will implement a data management and monitoring process as part of the overall monitoring of RAP commitment and performance. The reporting/ data management and monitoring process will include stakeholder participation and ensure that areas of improvement and stakeholder feedback are addressed.

8.2 REPORTING MECHANISMS

All engagement activities throughout the life of the Project, will be documented and filed in order to track and refer to records when required and ensure delivery of commitments, made to stakeholders. The following stakeholder engagement records and documentation will be used and mainly by ProjectCo.

- **Stakeholder engagement database /log:** Used to store, analyze and report on stakeholder engagement activities. It will be populated with details on information presented, audience questions, responses and commitments made and actions, and meeting evaluation results, when appropriate. The database will also be used to track frequency of meetings.
- **Meeting template:** Used to collect full meeting minutes to be filled with the stakeholder's database.
- **Stakeholders list:** On-going updates to the list, including key contacts and contact details (telephone number, email addresses etc.) as additional stakeholders are identified and will include the following:
 - National regional and local authority
 - Local community leaders including village heads and the Traditional Authority;
 - Community representative such as farmers, women, health workers and teachers;
 - Local industry (tourism and agriculture); and
 - International national or local environmental and social non-governmental organisations.
- **Grievance log:** To record all grievances received in order to address grievances and record whether it has satisfactorily been closed out, to identify patterns, avoid recurrent problems and improve the company's overall social performance.

- **Media monitoring:** Includes monitoring of press and radio stories relevant to the Project.

Templates for the above documents are provided in *Appendix B*.

All documents will be reviewed on a monthly basis in order to ensure that it is up to date and that required meetings are being held

Appendix B

Example Stakeholder Engagement Management Templates

APPENDIX B: STAKEHOLDER ENGAGEMENT MANAGEMENT TEMPLATES

8.3

MEETING MINUTES TEMPLATE

Meeting Minutes Template		
Section 1. Meeting Details		
Location:		
Settlement:		
Traditional Authority:		
District:		
Region:		
Date:		
Project Representatives:		
No of Females:	No of Males:	
Section 2: Meeting Minutes (note relevant questions, responses)		
Section 3: Facilitator Observations		
Insert key observations (level of participation, response to the meeting, general observations):		
Section 4: Follow-on Actions		
Issue Raised	Who by?	Action

Section 5: Evaluation of Feedback Process			
How many participants took part in the feedback process?			
Insert the number of yes, no, partially responses to each question in the relevant box			
Was the meeting useful?	Yes	No	Partially
Was the information presented in a clear manner and do you feel that you have a good understanding of the project activities and plans?	Yes	No	Partially
Were you able to ask the questions you wanted?	Yes	No	Partially
Was this meeting organised in a way to facilitate your attendance?	Yes	No	Partially

STAKEHOLDER DATABASE/ACTIVITY LOG (EXCEL SPREADSHEET)

Section 1: Meeting Details	Location	Settlement	District (use picklist)	Traditional Authority (use picklist)	Region (use picklist)	Date of Meeting	Project Representatives (Full name and company)	No of Females	No of Males

Section 2: Meeting Mins	Issue Title (Use picklist)	Participant Question/Comment/Quote	Project Response (If no response required or given, leave blank)	Issue Rating (low/medium/high priority)

Section 3: Facilitator Observations	Insert key observations (level of participation, response to the meeting, general observations):

Section 4: Follow-on Actions	Issue Raised	By Who?	Action

Grievance Record			
Grievance Number:	Date Submitted:	Target Date for Resolution:	
Name:			
Address and Contact Details			
Grievance Received By:			
Name of Grievance Officer:			
Description of Grievance:			
Assessment of Grievance Significance Level:		Signature and Role:	
Actions to Resolve Grievance			
Delegation to:			
Action	Who	When	Completed Y/N/Date
Response/Resolution:			
Strategy to Communicate Response:			
Sign-Off:			
Date:			
Conclusion			
Is complainant satisfied?	Y/N	Comments from Grievance Officer:	
Complainant comments regarding resolution:			
Grievance Closed?	Y/N	Grievance Resubmitted?	Y/N
Signature and Role:		Date:	
Date:		New Grievance Number:	

Section 1 - Details						
Grievance record number	Date communicated	Time communicated	Name of complainant if not anonymous	Contact number of the complainant	Address of complainant	Name of staff member that received the complaint

Section 2 - Grievance Raised		Section 3 - Reporting and Acknowledgement			
Grievance subject (eg land acquisition, employment, health)	Description of issue/complaint	Communication channel used (eg face to face, telephone, email etc)	Has the issue been documented in a grievance record form? (Y/N)	Has an acknowledgement been submitted to the complainant with a redress date? (Y/N) if so what date?	Name of staff member that submitted the acknowledgement to the complainant

Section 4- Grievance Management			Section 5 - Corrective Actions/Resolution								
Has the complaint been re-assigned to a different person/department?	Name of staff member managing the complaint	Expected resolution date	Description of resolution	Has the resolution been communicated to the complainant?	Method of communication to the complainant	Date resolution communicated to the complainant	Is the complainant satisfied with the resolution? (Y/N)	If not, what additional action is being taken?	Name of staff member assigned	Revised resolution, if applicable	Grievance status started/pending/

GRIEVANCE FORM

Grievance Record			
Grievance Number:	Date Submitted:	Target Date for Resolution:	
Name:			
Address and Contact Details			
Grievance Received By:			
Name of Grievance Officer:			
Description of Grievance:			
Assessment of Grievance Significance Level:		Signature and Role:	
Actions to Resolve Grievance			
Delegation to:			
Action	Who	When	Completed Y/N/Date
Response/Resolution:			
Strategy to Communicate Response:			
Sign-Off:			
Date:			
Conclusion			
Is complainant satisfied?	Y/N	Comments from Grievance Officer:	
Complainant comments regarding resolution:			
Grievance Closed?	Y/N	Grievance Resubmitted?	Y/N
Signature and Role:		Date:	
Date:		New Grievance Number:	

Consolidated List of Stakeholders

Name	Company/organisation/village	Position	Telephone number	email
W Kasakula	MERA	SRES	0999282484	wkasakula@meramalawi.mw
F Mpholopolo	MERA	R. E.R Specialist	0881232533	fmpholopolo@meramalawi.mw
Evilasio Mwale	Escom	Senior Engineer	0884419999	emwale@escm.mw
Shamiso Nagira	EAD	Deputy Director	0999895000	shamiso_b@yahoo.com
Tananga Nyirenda	EAD	Principal Env Officer	0991984303	tananganyirenda@yahoo.com
Sinya Mtawali	Ministry of Labour	Senior Occupational Safety & Health Officer	0884451383	csgmtawali@yahoo.co.uk
F Ngobende	Buildings Department	Chief Building Services Engineer	0999512462	ngobende@yahoo.com
J Mdambo	Buildings Department	Chief Landscape Architect	0995050444	josephymdambo@gmail.com
Blessings Phiri	Ministry of Agriculture and Water Department	SCE	0999169290	bulezulu@gmail.com
Jabulani Thadzi	Ministry of Agriculture and Water Department	SCE	0999607447	thadzi@gmail.com
Cynthia Chilima	Ministry of Lands	Principal Evaluation Officer	0999493175	u15372287@tuks.co.za
Adam Jason	Department of Forestry	DFO	0881022055	jasonadams2@yahoo.com
Naves Chogawana	Department of Environment	EDO	0991849884	chogawana@gmail.com
Blessings Mahala	Salima DC	DLO	0881519335	mahala.blessings@yahoo.com
Gregory Mamba	Salima DC	Assistant DLO	0995410103	
Jonathan Chikofa	Department of Lands	Valuation Officer	0999374858	jchikofa@gmail.com
Robert Sakala	Department of Lands	Surveyor	0999407275	rsakala3@gmail.com
Raphael Sikoti	Department of Lands	Valuation Officer	0888551826	raphaelsikoti@gmail.com
Charliers Mwawembe	Salima DC	DC		charlesmwawembe@yahoo.com
Lucius Donsa	Environmental Health	DEHO	0999945943	lucdarbydonsa@gmail.com
McDinnex Chavala	Labour	DLO	0999422353	magchavala@yahoo.com
Fedda Mbwana	Social Welfare	PSWO	0992273268	feddambwana@gmail.com
D Chogawana	Environmental Affairs	EDO	0991841884	chogawana@gmail.com
B Chunga	Community Development	EDO	0888301940	chinga.brighton@yahoo.com
Walter Changwe	Water Department	DWDO	0999661149	walterchangwe@gmail.com
Serina Leonard	Kazimbe 2	Farmer - VSL		
Mausiyeko Sarima	Kazimbe 2	Farmer - VSL		
Agnes Frackson	Kazimbe 2	Farmer - VSL		
Tereza Kotoanga	Kazimbe 2	Farmer		
Ester Chatayika	Kazimbe 2	Farmer - VSL		
Neria Mitcoard	Kazimbe 2	Farmer - VSL		
Veronica Foriasi	Kazimbe 2	Farmer		
Chikondi Zefenia	Kazimbe 2	Farmer		
Lamesi Innocent	Kazimbe 2	Farmer		
Fitinina RaPhewell	Kazimbe 2	Farmer - VSL		
Lydia Yakobe	Kazimbe 2	Farmer		
Savana Jackson	Kazimbe 2	Farmer - VSL		
Mercy Madaitso	Menyako	Farmer - VSL		
Naresi Chatayika	Kazimbe 2	Farmer - VSL		
Judith Mafiyi	Menyako	Farmer		
Lucia Moroni	Menyako	Farmer - VSL		
Ketrina Mwaziena	Jepputula	Housewife - VDC Member		
Mary Reuben	Kazimbe 2	Farmer - VGR Member		
Angela Damiano	Jepputula	Housewife - Mother Group Member		
Juness Luka	Jepputula	Treasure School Group		
Lettina Samuel	Menyako	Farmer		
Loveness Limbikani	Kazimbe 2	Housewife - Mother Group Member		
Salome Lafuwe	Kazimbe 2	Farmer		
Enita Menyako	Kazimbe 2	Farmer/Housewife		
Emily Shaibu	Menyako	Farmer/Housewife		
Ndidapha Chimbala	Menyako	Farmer		
Kutsala Chienda	Jepputula	Farmer - VSL		
Enelesi Tsite	Menyako	Farmer - VSL		
Elemia Katcher	Jepter	Farmer		
Chataika Chilima	Kazimbe 2	Farmer		
Victor Jasi	Kazimbe	Tailor		
James Zefaniya	Kazimbe	Farmer - Graveyard Chairman	099574698	
Davide Livison	Menyako	Farmer		
Rodney Kuwani	Kazimbe 2	Farmer	0885968973	
Sapuledi Chimpote	Kazimbe 2	Builder	0993394900	
Willison Kadiwa	Kazimbe 2	Farmer		
Mtonga Chimzulu	Malezi	Farmer		
Richard Tembo	Kazimbe	Farmer	0880170691	
Howard Mazengela	Kazimbe 1	Farmer	0997195790	
Eston Kingford	Jepter	Farmer	0991711386	
Hamilton Lemon	Kazimbe	Carpenter		
Chibvutitso Mbangale	Kazimbe	Farmer	0995116362	
Maulana Tchaka	Kazimbe	Farmer		
Gerald Thomas	Malezi	Farmer - Village Bank Chairman		
MacDonald Dalson	Kazimbe 2	Bicycle Hirer		
Chipirino Medson	Malezi	Farmer		
Thokozani Lameck	Kazimbe 2	Farmer		
Mabvuto Kenes	Kazimbe 2	Farmer		
William Keness	Kazimbe 2	Carpenter	0998638110	
Yohane Sauzande	Mayambo	Farmer		
Shaibu Bikozi	Kazimbe	Farmer		
Moses Matias	Kazimbe 2	Farmer		
Sewelo Andson	Kazimbe	Farmer		
Sungani Militeni	Kazimbe	Farmer - Village Head		
Lekedda Chimale	Melezi	Farmer - Village Head		
Redson Chiyede	Jepputula	Farmer - Village Head		0999740726
Mdekand Botsisi	Kazimbe	Farmer - GVH		0995489042
Botsisi Sayeni	Menyako	Farmer - Village Head		0995479095
Irene Miliward	Mpulan	Farmer - Village Head		
Lochi Kadiwa	Kazimbe	Farmer		
Rastind Denson	Kazimbe 2	Farmer		
Levison Chidambua	Jepputula	Farmer		099661813
Robert Dimosi	Kazimbe 2	Farmer		
Isaac Charles	Kazimbe 2	Farmer		
Chimamba Lende	Nkhomo	Farmer		0595237310

Kalisti Lanedi	Kazimbe 2	Farmer		
Kalipsti Chimewi	Nkhomo	Farmer		
Juleasi Banda	Kazimbe 1	Farmer		
Milliaward Childawai	Kazimber 1	Farmer		
Benina Denisoni	Mayambo	USL		
Sofiya Kariyi	Mayambo	Farmer - TOP UP USL		
Siperina Gerisa	Mayambo	Farmer - TOP UP USL		
Farida Faka	Mayambo	Farmer - TOP UP USL		
Lariza Chifunda	Mayambo	Farmer - TOP UP USL		
Yesinati Lafironi	Mayambo	Farmer - TOP UP USL		
Lealesi Musa	Mayambo	Farmer - TOP UP USL		
Lusina Jenala	Mayambo	Farmer - TOP UP USL		
Olinesi Gifiti	Mayambo	Farmer - TOP UP USL		
Mese Machilika	Mayambo	Farmer - TOP UP USL		
Yenifa Mwachilolo	Mayambo	Farmer - TOP UP USL		
Gilezi Nepiyala	Mayambo	Farmer - TOP UP USL		
Luzilila Jumbe	Mayambo	Farmer - TOP UP USL		
Yemile Zenasi	Mayambo	Farmer - TOP UP USL		
Rhilstina Kadango	Mayambo	Farmer - TOP UP USL		
Khillise Yosefe	Mayambo	Farmer - TOP UP USL		
Lozi Deniyazi	Mayambo	Farmer - Baki		
Muipenji Chapana	Mayambo	Farmer		
Selina Jutayi	Mayambo	Farmer		
Akello Mazombwe	Mayambo	Farmer - VSL		
Milka Chapepa	Mayambo	Farmer - VSL		
Zione Charler	Mayambo	Housewife / Kitchen Top up		
Limange Positani	Mayambo	Kitchen Top up		
Christina Charles	Mayambo	Kitchen Top up		
Agnes Jackson	Mayambo	Community Health		
Violet John	Mayambo	Community Health		
Bertha Charles	Mayambo	Kitchen Top up		
Charisma Bellium	Mayambo	VSL, Top up		
Stella Sevinala	Mayambo	VSL, Top up		
Pillilani Maliseni	Mayambo	VSL, Top up		
Elisa Loster	Mayambo	Top up		
Violet Alexander	Mayambo	VSL		
Ellena Nkhona	Mayambo	VSL, Top up		
Ellube Kashoni	Mayambo	VSL		
Tumange Kandana	Mayambo	VSL		
Melisia Chifundo	Mayambo	Farmer		0992910343
Rabeka Matiki	Mayambo	Farmer		
Sitela Sfularton	Mayambo	Farmer		
Naripafe Yedizopedi	Mayambo	Farmer		
Mariya Peniyaza	Mayambo	Farmer		
Marita Jakisoni	Mayambo	Farmer		
Liginesi Ticoopa	Mayambo	Farmer		
Poseyi Timoni	Mayambo	Farmer		
Lifineti Joji	Mayambo	Farmer		
Sofeleki Jemusi	Mayambo	Farmer		
Malinga Leumura	Mayambo	Farmer		
Amon Laison	Mayambo	Farmer		
Davidson Kalimbata	Mayambo	Farmer		
Garizami Jeremiah	Mayambo	Farmer		
Rayabu Godfrey	Mayambo	Farmer		
Steven Maxwell	Mayambo	Farmer		
Batwell Basiweli	Mayambo	Farmer		
Dinosi Jumbe	Mayambo	Farmer - GVH	0998240141	
April Chipikuze	Mayambo	Farmer - VH	0995058514	
Maria Chifunda	Mayambo	Housewife	0998824692	
Lioni Gulube	Mayambo	Farmer		
Yosefe Lomisi	Mayambo	Farmer		
Letela Masamba	Maonga	Farmer		
Elissa Jonesi	Mayambo	Farmer	0993094594	
John Garizanni	Mayambo	Farmer		
Foster Zawara	Mayambo	Farmer		
Chirwande Kapanda	Mayambo	Farmer		
Lamende Masuto	Mayambo	Farmer		
Frank Grecian	Mayambo	Farmer		
Tikalipo Bisalom	Mayambo	Farmer	0998630118	
Shema Batsom	Mayambo	Farmer		
Fabiano Chifundo	Mayambo	Farmer		
Blessings Timothy	Mayambo	Farmer	0999401121	
Lesten Chifundo	Mayambo	Farmer		
Wisky Timothy	Mayambo	Farmer		
Lefan Lemusi	Mayambo	Farmer		
Chiluwe Frem	Mayambo	Farmer		
Lyford Timothy	Mayambo	Farmer	0998276861	
Steven Type	Mayambo	Farmer	0993032758	
Eliya Simon	Mayambo	Farmer	0884852337	
Charles Malosen	Mayambo	Farmer		
Fatsan Jumber	Mayambo	Farmer		
Thokozani Tiwopa	Mayambo	Farmer		
Thomas Kadango	Mayambo	Farmer - Assistant VH	0996416944	
Governor Mailles	Mayambo	Farmer		
Garman Matias	Mayambo	Carpenter	0991715870	
Jonathan Chikofa	Mayambo	Farmer		
Jeremiah Shema	Mayambo	Farmer	0992228588	
Eston Jakulo	Mayambo	Farmer		
Mastone Banda	Mayambo	Farmer - VH	0992868655	
Madaletso Samson	Mayambo - Njoka	Farmer	0998379349	
Size Honda	Mayambo - Njoka	Farmer	0993892254	

Helbert Chioza	Mayambo	Farmer	0998787727	
Shtiyeye Pastani	Mayambo - Njoka	Farmer		
Alinezi Zakalia	Kazimbe - Mtolo	Quarrystone		
Estere Byson	Kazimbe - Waya I	Farmer		
Violet Sinkaziwa	Kazimbe - Santhe	Farmer		
Teleza Lefinawo	kazimbe - Santhe	Farmer		
Dorothy Byson	Kazimbe - Waya I	Farmer		
Lezina Mwamadi	Kazimbe - Waya I	Farmer		
Estere Kinglisy	Kazimbe - Waya I	Piece Works		
Fatsani Kanyambo	Kazimbe - Santhe	Piece Works		
Patricia Byson	Kazimbe - Waya I	Piece Works		
Agness Elisa	Kazimbe - Waya I	Piece Works	0993696608	
Fanasia Mabuto	Kazimbe - Waya I	Piece Works		
Gladys Chirwa	Kazimbe - Waya I	Piece Works	0994286496	
Mahita Suluma	Kazimbe - Waya I	Piece Works		
Luiness Jumu	Kazimbe - Waya I	Piece Works		
Chesi Zakeyu	Kazimbe - Waya I	Piece Works		
Fannu Ganeti	Kazimbe - Waya I	Piece Works		
Kacy Kamwando	Kazimbe - Waya I	Farmer		
Kohia James	Thangani - Sadzu	Piece Works		
Dorothy Chilamba	Kazimbe - Santhe	Farmer		
Grace Banda	Sadzu	Farmer		
Stelia Hezenia	Kazimbe	Farmer		
Ha Amiyani	Kazimbe	Farmer		
Tereza Masunde	Kazimbe	Farmer		
Jeremy Chirwa	Kazimbe	Farmer		
Lucia Mdembo	Kazimbe	Farmer		
Regina Mosamadi	Kazimbe	Farmer		
Joice Kalulu	Kazimbe	Farmer		
Lucia Lufunawo	Kazimbe	Farmer		
Gladness Jonasi	Kazimbe	Farmer		
Lezita Kanyembo	Kazimbe	Farmer		
Gladys Beniasi	Sadzi - Thangani	Farmer		
Stelia Chisulo	Kazimbe	Farmer	0884116350	
Lucy Gibson	Kazimbe	Farmer	0995626413	
Madalo Elisa	Kazimbe	Farmer		
Mahita James	Kazimbe	Farmer		
Enelesi Kalulu	Kazimbe	Farmer		
Lidziness Kadimanja	Kazimbe	Farmer		
Agness Lyson	Kazimbe	Farmer		
Fariesi Frank	Kazimbe	Farmer		
Emily Nyuliyeti	Kazimbe	Farmer		
Ekilna Chikoya	Kazimbe	Farmer	0997174261	
Maria Chimuta	Kazimbe	Farmer	0993070002	
H Kumbande	Kazimbe - Waya I	HAS	099912583	
GVH Mayambo	Mayambo	Village Head	0998240141	
GVH Koso	Koso	Village Head	0997085610	
VH Mwape	Kazimbe - Mwape	Village Head	0992174591	
GVH Sadzu	Sadzu	Village Head	0881751244	
GVH Vunguti	Vunguti	Driver	0998274337	
VH Malumbula	Malumbula	Farmer	0993246735	
VH Mtolo	Kazimbe - Mtolo	Farmer		
GVH Waya	Kazimbe - Waya	Farmer	0880034174	
VH Sante	Kazimbe - Sante	Farmer	0993071042	
VH Michembo	Malesi - Michembo	Farmer	0998349533	
Joseph John	Maya I	Farmer		
S Masimbe	Sadzu - Thangani	Farmer	0881666080	
VH Chiwaka	Gologolo - Chiwaka	Farmer	0995450134	
M Chisaka	Muunguti	Farmer	0995491354	
N Chendulani	Kazimbe - Sante	Farmer	0993364513	
S Chatsika	Waya	Farmer		
Y Mbendela	Kazimbe - Mputeni	Builder	0886817170	
W Chauunga	Waya I	Farmer	0884025241	
C Victor	Malizi - Mtolo	Farmer		
P Lexion	Waya I	Farmer	0999947079	
J Luben	Kazimbe - Sante	Farmer		
D Richman	Sadzu	Farmer		
Eferemu Juwao	Kazimbe - Santhe	Watchman	0882335407	
Edward Chilemba	Kazimbe - Santhe	Farmer		
Skyford Gilo	Kazimbe	Farmer		
Lyson Ngamasauka	Malezi - Mtolo	Farmer		
Kesawa Chankokololo	Malezi - Mtolo	Farmer		
Luster Jonas	Kazimbe - Waya I	Farmer	0884310234	
Kingsley Msinga	Kazimbe	Farmer		
Bobo Fulatia	Kazimbe	Farmer	0995962424	
Vickson Benson	Kazimbe	Farmer		
Edward Boxen	Kazimbe - Santhe	Farmer		
Peter Kamanika	Sadzu - Malumbila	Farmer		
Yamikani Cobra	Kazimbe - Waya	Farmer	0991402225	
Joseph Kosmas	Kazimbe - Sante	Teacher	0999453033	
Compleso Flackson	Kazimbe - Sante	Builder	0994219063	
Levison Enock	Kazimbe - Waya I	Builder	0991339114	
Jackson Banda	Kazimbe - Waya I	Business	0993071079	
Josca Mizeck	Sadzu - Chimamba	Farmer	0884830524	
Lucas Lameck	Kazimbe - Mtolo	Driver	0880887510	
Alexander Nomgona	Kazimbe - Waya	Farmer	0996167752	
German Zakeyu	Kazimbe - Mtolo	Business	0995106161	
Hastings Mangile	Kazimbe - Waya	Teacher	0882643629	
John Ezekiel	Kazimbe - Waya	Carpenter	0998207685	
Rashid Enock	Kazimbe - Waya	Farmer	0999422724	
Wedson Dickman	Sadzu	Farmer		

Masauko George	Kazimbe - Waya I	Carpenter	0999701146	
Mazuzu Standford	Kazimbe - Malezi	Farmer		
Stephano Magwira	Kazimbe - Mtolo	Farmer		
Matoya German	Sadzu	Farmer	099589104	
Mulaulo Yakobe	Waya	Farmer		
Enock Santhe	Malezi - Santhe	Farmer		
Charles Simazui	Malezi - Santhe	Farmer		
Dinda Kamwendo	Waya	Farmer		
Lewandala Chimbele	Malezi - Waya	Farmer		
Timothy Tambo	Waya	Farmer	0992254213	
Lameck Lucas	Waya	Farmer		
James Paulos	Waya	Farmer		

Appendix A

Scoping Disclosure and Social Baseline Engagement Activities

A1.1 *ENGAGEMENT MEETINGS*

A list of meetings undertaken is provided in the tables below. The meeting minutes, registers and meeting feedback forms (where applicable) are also included in this Appendix together with the engagement materials used.

Table 1.1 *Government Meetings*

Date	Meeting
23/04/18	Environmental Affairs Department
23/04/18	ESCOM
23/04/18	Malawi Energy Regulatory Authority (MERA)
24/04/18	Department of Labour
24/04/18	Department of Lands
24/04/18	Ministry of Transport and Public Infrastructure
24/04/18	Ministry of Agriculture, Irrigation and Water Development
24/04/18	Salima District Council

Table 1.2 *Village Meetings*

Date	Location	Villages Represented	Females	Males	Total
24/04/18	Kanzimbe	Kanzimbe, Kanzimbe 2, Menyako, Maiezi, Mputeni, Jephytala, Malezi	45	40	85
25/04/18	Mayambo	Mayambo, Njoka, Kanthiti, Chishasha, Kachepela	44	46	100
26/04/18	Nanjoka	Waya 1, Santhe, Motolo, Sadzu, Malezi, Thangani, Mwape, Malumbula, Michembo, Vonguti, Kuso, Chiwaka	74	54	128
Total			163	140	313

A1.2 *SOCIAL BASELINE ACTIVITIES*

Below are the various baseline activities that were undertaken in relation to the ESIA.

Table 1.3 *Village Profiles*

Date	Location	Respondent
16/01/2018	Mayambo	Mayambo Village Chief (Chief Mayambo)
17/01/2018	Kanzimbe	Village Group Headman (Maliyati Botiyasi)
06/06/2018	Waya	Village Group Headman (Chigwire Kunchenga)
02/06/2018	Sadzu	Chief Sadzu (Tifelanji Miamba)

Table 1.4 *Focus Group Discussions*

Date	Location	Type	Males	Females
15/01/2018	Kanzimbe	Men		15
15/01/2018	Kanzimbe	Women		12
16/01/2018	Mayambo	Men	23	
16/01/2018	Mayambo	Women		20

Date	Location	Type	Males	Females
30/05/2018	Santhe	Youth		6
30/05/2018	Sadzu	Women		31
30/05/2018	Santhe	Women		36
30/05/2018	Waya 1 & Santhe	Men	14	
02/06/2018	Sadzu	Men	13	

Table 1.5 *Key Informant Interviews*

Date	Location	Topic Area	Respondents
17/01/2018	Katawa Community Clinic	Health	Spartan Rolen Makanga, Community Health Worker
17/01/2018	Namanda Primary School	Education	Mr Magawa Milk: Section Head, Guidance and Counselling, Child Protection Mr Steven Liston: Assistant Deputy Head ,Senior Section Head, ECO Focal Point, Ms Msozi Kamanga: Keeping Girls in School Focul Person, Sanitation Committee member, Child Protection Committee member
17/01/2018	Mbwezera Primary School	Education	Mrs Mary Kumbwenda (Head Teacher)
17/01/2018	Kanzimbe Community Police	Security	Committee chair: Seven Chikafa Vice chair: Davy Chambukira
17/01/2018	Salima Technical Collage	Education	Deputy principal- Mr L. Chipala
17/01/2018	Kanzimbe Trading Centre	Trading	Management Committee for Kanzimbe Market (5 males and 5 females)
01/06/2018	Kaphirintiwa Community Day Secondary School (CDSS)	Education	Ernest Katuku, School Headmaster

Government/Stakeholder –Department of Water		
Section 1: Meeting Details		
Date and time:	24/04/2018	
Full names of project representatives:	Kent Kafatia Brendon Solik	
Name of participants (name and position) – Take register:	Thadzi Jabulani Blessings Phiri	
Location:	Tikwere House, Lilongwe	
District:	Lilongwe	
No of female participants:	1	No of male participants:
		3
Total no of participants:	4	
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)		
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years.</p> <p>1. Question/ concern: Mr. Thadzi noted that the project is designed for 20 years. He wanted to know what will what happen to the solar power plan after the 20 years?</p> <p>Response: After the 20 years, the ProjectCo may decide what to do with the project. Options may include to upgrade or remove solar panels. If the decision is to remove panels then a decommissioning plan will be prepared.</p> <p>2. Question/ concern: Mr. Thadzi noted that the project will generate up to 40 Mega Watt of electricity. He wanted to know how many households will be able to connect to this amount of power?</p> <p>Response: The electricity generated from the proposed solar power plant will be connected to the ESCOM's / national power grid, through the substation at Nanjoka in Salima. The power will therefore be accessible to all the different types of consumers currently supplied by ESCOM on the national grid. Hence, it is not easy to determine how many households will benefit from the power to be generated from the solar power plant.</p>		

Government/Stakeholder –Department of Water

3. With respect to the water supply options for Corporate Social Responsibility (CSR) projects being investigated for the communities in the project area, the consultant wanted to know how communal water points are operated and managed by the Water Department.

In response, the water supply officers said the Water Department develops community water supply schemes mainly as gravity-fed schemes, sourcing water from hills that are near the villages. From their experience, some of the gravity-fed community water supply schemes are well managed e.g. the scheme that was developed in Neno District. The gravity schemes are easy to manage and they do not have any mechanical equipment to operate and maintain. The schemes are operated and maintained by the communities themselves. A few community water supply schemes are developed by NGOs and some of these are also successfully operated and managed by communities.

4. The consultant wanted to know the situation of groundwater in the project area. In response, the officers from the Water Department stated that they were only responsible for surface water supply. They, therefore directed the consultant to Ms. Ziwone Uka and Mr Ferson Nkhata (Chief hydrogeologist). Unfortunately, the two officers were going into another meeting. However, they said that they have maps for occurrence of groundwater in the country and they would be able to share this information.

Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
This is a highly recommended initiative	Blessings Phiri	ERM

Section 4: Facilitator Observations

How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	The meeting went well, the consultants were received very well, the participants were accommodating and there was no hostility.
Insert any other key observations worth noting:	

Section 5: Meeting Evaluation Feedback Process (from feedback forms)

How many participants took part in the feedback process? 1

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	2			
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	2			
• Were you able to ask the questions that you wanted?	2			
• Was this meeting organised in a way to facilitate your attendance?	2			

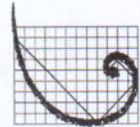
Section 6: Meeting Photo




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AFRICA



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ERM

MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: *Room 4 Water Supply Section*

Meeting Date: *24-04-2018*

• Was the meeting useful?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Were you able to ask the questions that you wanted?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

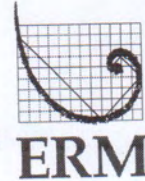
- This is a highly recommended initiative.



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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: TIKWERE HOUSE CITY CENTRE

Meeting Date: 24-04-18

	Yes	No	Partially
• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

	Yes	No	Partially
• Was the meeting useful?	Yes	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes	No	Partially
• Were you able to ask the questions that you wanted?	Yes	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes	No	Partially



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of water, Irrigation & Agriculture
Date:	24/04/2018
Location:	Ministry offices
Project Representative Names:	Brendon Solik & Kent Kutatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Gleung Phr	F	Ministry of Agr. Irr & WD	Water Supply	SCE	0999 169290	bule2ulu@gmail.com
2.	Jobulani Thoda	M	"	"	SCE	0999 607447	thodeji@gmail.com
3.							
4.							
5.							
6.							
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Government/Stakeholder –Department of Labour		
Section 1: Meeting Details		
Date and time:	24/04/2018	
Full names of project representatives:	Kent Kafatia Brendon Solik	
Name of participants (name and position) – Take register:	Mr. Mtawali	
Location:	Capital Hill, Lilongwe	
District:	Lilongwe	
No of female participants:	0	No of male participants:
		3
Total no of participants:	3	
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)		
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years.</p> <p>1. Question/ concern: How many people will be employed? There is need to know the operation.</p> <p>Answer: Most of the labourers (10 to 15) people will be required during construction. Where possible, these will be employed from the local community or Salima Town. Skilled labour may be sourced from outside Salima District. During operation, only a few people will be required to maintain the security of the premises, as the solar panels do not require to be operated by anyone.</p> <p>Mr. Mtawali advised that:</p> <p>a. There will be need to register with the Ministry of Labour during the construction (a licence will have to be issued). The capital investment and number of employees will have to be specified in the licence. An operating licence is also a requirement by the Ministry of Labour.</p>		

Government/Stakeholder –Department of Labour

- b. Toilets for the workers will have to be provided. The rule is that there should be 20 people to 1 toilet and separate toilets for males and females should be provided. The workers will also have to be provide with potable drinking water.
- c. For more than 50 people, there will be need to form a safety committee. This committee can be trained by the Department of Labour
- d. There will be need to have a fence around the construction site and PPE will have to be provided to the workers.
- e. The Ministry of labour has the capacity to monitor the projects.

Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
		ERM

Section 4: Facilitator Observations

How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	We were received well and the participants were accommodating.
Insert any other key observations worth noting:	

Section 5: Meeting Evaluation Feedback Process (from feedback forms)

How many participants took part in the feedback process? 1

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes		Partially	Total no of responses
• Was the meeting useful?	1			
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	1			
• Were you able to ask the questions that you wanted?	1			

<ul style="list-style-type: none">Was this meeting organised in a way to facilitate your attendance?	Yes 1		Partially	Total no of responses
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Section 6: Meeting Photo

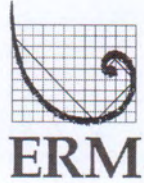




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**MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)**

Meeting Location: Capital Hill (Department of Labour)

Meeting Date: 24/04/2018

• Was the meeting useful?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Were you able to ask the questions that you wanted?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of Labour
Date:	24/04/2018
Location:	Ministry offices, Capital Hill
Project Representative Names:	Blendo Solih & Kent Kufatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Sinya Mtawali	Male	Ministry of Labour	Department of Occupational Safety & Health	Senior Occupational Safety & Health Officer	0884451383	csgmtawali@yahoo.co.uk
2.							
3.							
4.							
5.							
6.							
7.							
8.							
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Government/Stakeholder –Ministry of Lands Headquarters			
Section 1: Meeting Details			
Date and time:	24/04/2018		
Full names of project representatives:	Kent Kafatia Brendon Solik		
Name of participants (name and position) – Take register:	Cynthia Chilima		
Location:	Department of Lands, Lilongwe		
District:	Lilongwe		
No of female participants:	1	No of male participants:	2
Total no of participants:	3		
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)			
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years.</p>			
<p>1. Question/ comment: When will the Project start and how long will construction take?</p> <p>In response, the consultants responded that the project is to start at the beginning of next year, 2019 and construction will take 9 months.</p>			
<p>2. Question/ comment: What will be the affected area?</p> <p>In response, it was stated that the solar farm will cover approximately 186 hectares of land and the way leave for the transmission line (TL) will be 30 metres wide for approximately 3-4 km.</p>			
<p>3. Question/ comment: Has a Resettlement Action Plan (RAP) been prepared?</p> <p>In response, it was stated that a RAP has not been prepared as it is envisaged that there will not be any physical displacement. One household may be relocated along the Transmission Line route, however the objective is to try and avoid resettlement. However, a Livelihood Restoration Plan will be prepared for those who will lose farmland.</p>			

Government/Stakeholder –Ministry of Lands Headquarters

In reaction to this, the officer from the Department of Lands emphasised that the LRP must be submitted to the Department of Lands for approval.

The consultants wanted to know if the Department of Lands has a format for the LRP and in response, they said they do not have one but the process is guided by the Land Act.

Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
		ERM

Section 4: Facilitator Observations

How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	The meeting went on well and we were received well.
Insert any other key observations worth noting:	

Section 5: Meeting Evaluation Feedback Process (from feedback forms)

How many participants took part in the feedback process? 1

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	1			
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	1			

• Were you able to ask the questions that you wanted?	Yes 1	No	Partially	Total no of responses
• Was this meeting organised in a way to facilitate your attendance?	Yes 1	No	Partially	Total no of responses

Section 6: Meeting Photo

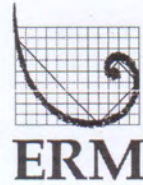




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**MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)**

Meeting Location: Ministry of Lands, Headquarters

Meeting Date: 24th April 2018

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

• Was the meeting useful?	Yes	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes	No	Partially
• Were you able to ask the questions that you wanted?	Yes	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes	No	Partially



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Department of lands
Date:	24/04/2018
Location:	Department of lands, Lilongwe
Project Representative Names:	Brendon Solik & Kent Kafakia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Cynthia Chilone	f	Ministry of Lands	Department of Lands	Principal valuation ^{office}	0999493171	415372287@tues.co.zw
2.							
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Government/Stakeholder -EAD		
Section 1: Meeting Details		
Date and time:	23/04/2018	
Full names of project representatives:	Brendon Solik Kent Kafatia	
Name of participants (name and position) – Take register:	Dr. Tananga Nyirenda (Principle Environmental Officer) Ms. Shamiso Najira (Deputy Director)	
Location:	City Centre, Lilongwe	
District:	Lilongwe	
No of female participants:	1	No of male participants:
		3
Total no of participants:	4	
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)		
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years.</p> <ul style="list-style-type: none"> • Question/ comment: In reaction to the presentation, the Environmental Affairs Department showed interest in the project which aligns to the climate change management policy, and meets the Paris Agreement determined contributions to reduce emissions. In addition it was noted that renewable energy typically has fewer negative environmental impacts. • They recommended that the Electricity Generating Company (EGENCO), the Department of Energy (DOE), and District Environmental Officer at Salima should all be consulted. <p>The consultant responded that this consultation is part of the preliminary stakeholder engagement for the Scoping Phase of the Environmental and Social Impact Assessment (ESIA) study. The two institutions and others will be consulted during preparation of the Draft ESIA.</p> <ul style="list-style-type: none"> • Question/ comment: What type of waste is likely to be generated and how will damaged panels be disposed of? 		

Government/Stakeholder -EAD

In response, the consultant advised that during construction, the main waste will consist of packaging material, which will be disposed of in designated waste disposal sites as guided by the Salima District Council. It is not anticipated that there will significant amounts of hazardous waste, however in the vent of hazardous waste 9including broken panels), these will be disposed of by the contractor, in line with the ESIA recommendations.

- **Question/ comment:** What happens after the 20 years life time of the project?

In response, the officers of the EAD stated that the project developer will discuss with the relevant government agents on the activities that will follow after the 20 years.

Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
		ERM

Section 4: Facilitator Observations

How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	Well received
Insert any other key observations worth noting:	

Section 5: Meeting Evaluation Feedback Process (from feedback forms)

How many participants took part in the feedback process? 1

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	2			
• Was the information presented in a clear manner and do you feel that you have a good understanding	2			



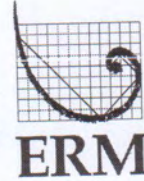
of the projects' activities and plans?				
• Were you able to ask the questions that you wanted?	Yes 2	No	Partially	Total no of responses
• Was this meeting organised in a way to facilitate your attendance?	Yes 2	No	Partially	Total no of responses



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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: EAD

Meeting Date: 23/04/18

	Yes	No	Partially
• Was the meeting useful?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Were you able to ask the questions that you wanted?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Environmental Affairs Department (EAD)
Date:	13/04/2018
Location:	EAD offices, Lilongwe
Project Representative Names:	Brendon Solik and Kent Kufatira

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Shamiso Ngjira	F	EAD		Deputy Director	0999895000	shamiso_b@qghoo.com
2.	Tanang Nyirenda	M	EAD		Principal Env Officer	0991984303	tananganyirenda@qghoo.com
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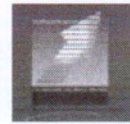
Government/Stakeholder ESCOM		
Section 1: Meeting Details		
Date and time:	23/04/2018	
Full names of project representatives:	Brendon Solik Kent Kafatia	
Name of participants (name and position) – Take register:	Evilason Mwale, Distribution Manager	
Location:	Lilongwe	
District:	Lilongwe	
No of female participants:		No of male participants: 3
Total no of participants:	3	
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)		
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts temporary noise, vehicles movement on the road and dust, disturbance of livelihoods, additional water demand for construction, additional water for cleaning the panels during operation (the borehole could be used by the community) and waste generation. Potential positive impacts include power availability, CSR program and employment opportunities</p> <p>In response, Mr. Mwale stated that</p> <ul style="list-style-type: none"> • ESCOM have an environmental officer (Mike Mponda)- 0999 013901 for Central and Northern regions. • People were compensated for the old line on the project site. Information on the compensation to be given. • The wayleave width is 30 meters. • He emphasised that physical displacement must be avoided. 		
Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):		
Issue Raised	Who by?	Action (s)
	E Mwale	ERM

Government/Stakeholder ESCOM	
Section 4: Facilitator Observations	
How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	Well received
Insert any other key observations worth noting:	

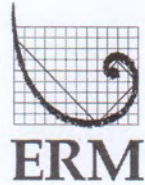
Section 5: Meeting Evaluation Feedback Process (from feedback forms)				
How many participants took part in the feedback process? 1				
Insert the number of yes, no, partially responses to each question in the relevant box				
• Was the meeting useful?	Yes 1	No	Partially	Total no of responses
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes 1	No	Partially	Total no of responses
• Were you able to ask the questions that you wanted?	Yes 1	No	Partially	Total no of responses
• Was this meeting organised in a way to facilitate your attendance?	Yes 1	No	Partially	Total no of responses



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**MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)**

Meeting Location: MAGETSI HOUSE

Meeting Date: 23rd April 2018

• Was the meeting useful?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Were you able to ask the questions that you wanted?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	ESCOM
Date:	23/04/2019
Location:	ESCOM offices, Lilongwe
Project Representative Names:	

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Brendon Solik		ERM		Consultant		
2.	EVILASIO MWALE	M	ESOM ESCOM	PLANNING	Senior Engineer	0884419999	emwale@escom.mw
3.							
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11.							
12.							
13.							

Government/Stakeholder -MALAWI ENERGY REGULATORY AUTHORITY		
Section 1: Meeting Details		
Date and time:	23/04/2018	
Full names of project representatives:	Brendon Solik Kent Kafatia	
Name of participants (name and position) – Take register:	Eng. Wilfred. Z. Kasakula Mr. Mwase	
Location:	Lilongwe MERA	
District:	Lilongwe	
No of female participants:	0	No of male participants: 3
Total no of participants:	3	
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)		
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years. He acknowledged the support from the Malawi Energy Regulatory MERA in facilitating the opening up of the Independent Power Producers (IPPs) participation in the energy sector.</p> <p>In response to the presentation, Mr. Kasakula made the following comments:</p> <ul style="list-style-type: none"> • Issuing of license by MERA to the IPPs is based on the Environmental and Social Impact Assessment (ESIA) approval certificate and acquisition of land according to the national procedures. • Official title to the land must be produced. • MERA encourages renewable energy generation. • This is the largest renewable (solar) project so far and MERA is following its progress closely.as well as the Government are very excited about it • At the moment, MERA does not have an institutional environmental policy. • In reaction to how the communities can benefit from the project directly (i.e. from the generated electricity) Mr. Kasakula stated that a min- grid framework is being developed and this would provide modalities of how communities can be supplied with electricity from mini-grids. 		

Government/Stakeholder -MALAWI ENERGY REGULATORY AUTHORITY

- MERA is very concerned with safety at works and therefore the developer has to observe all the relevant safety regulations, both during construction and operation.

Section 3. Actions - note any actions here and who it was raised (eg. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
<p>MERA appreciated being engaged and being provided with the information on the project.</p> <p>MERA would be interested in the ESIA report because it is one of the inputs into issuance of the generation license. However it leaves the mandate with the EAD who are the authority in environmental issues</p>	Mr. Mwase	ERM

Section 4: Facilitator Observations

How do you feel the meeting went (were you well received, were participants accommodating, was there any hostility towards the team?):	The consultants were received very well and there was no hostility of any kind
Insert any other key observations worth noting:	

Section 5: Meeting Evaluation Feedback Process (from feedback forms)

How many participants took part in the feedback process?

4

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	2			
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	2			

<ul style="list-style-type: none"> Were you able to ask the questions that you wanted? 	Yes 2	No	Partially	Total no of responses
<ul style="list-style-type: none"> Was this meeting organised in a way to facilitate your attendance? 	Yes 2	No	Partially	Total no of responses

Section 6: Meeting Photo

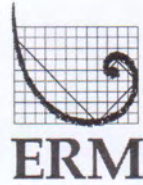




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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: NERA HQ

Meeting Date: 23/04/2018

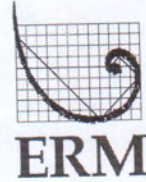
• Was the meeting useful?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Were you able to ask the questions that you wanted?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

⇒ Basically it was nice that JCM thought of providing mera with the information of the project. This will engage mera automatically in the same project.

JCM**InfraCo**
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**MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)**Meeting Location: MERA HEAD OFFICE (LILONGWE)Meeting Date: 23rd APRIL, 2018

	Yes	No	Partially
• Was the meeting useful?	<input checked="" type="checkbox"/>		
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="checkbox"/>		
• Were you able to ask the questions that you wanted?	<input checked="" type="checkbox"/>		
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="checkbox"/>		

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

MERA would be interested much in this report because it is one of the inputs into issuance of the generation licence.

However, it leaves the mandate with EAD who are the authority on environmental issues,



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	NERA
Date:	23/04/2018
Location:	NERA offices, Lilongwe
Project Representative Names:	Brendon Solik and Kent Katatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	W. Kasakula	M	NERA	Renewable Energy	SKES	0999282484	Wkasakula@nera.mw
2.	F. Mphosipole	M	NERA	RENEWABLE ENERGY	R.E.R SPECIALIST	0881237533	f.mphosipole@nera.mw
3.							* MW
4.							
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	ESCOM
Date:	23/04/2019
Location:	ESCOM offices, Lilongwe
Project Representative Names:	

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Brendon Solik		ERM		Consultant		
2.	EVILASIO MWALE	M	ESOM ESCOM	PLANNING	Senior Engineer	0884419999	emwale@escom.mw
3.							
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Environmental Affairs Department (EAD)
Date:	13/04/2018
Location:	EAD offices, Lilongwe
Project Representative Names:	Brendon Solik and Kent Kufatira

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Shamiso Ngjira	F	EAD		Deputy Director	0999895000	shamiso_b@qghoo.com
2.	Tanang Nyirenda	M	EAD		Principal Env Officer	0991984303	tananganyirenda@qghoo.com
3.							
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of Labour
Date:	24/04/2018
Location:	Ministry offices, Capital Hill
Project Representative Names:	Blendo Solih & Kent Kufatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Sinya Mtawali	Male	Ministry of Labour	Department of Occupational Safety & Health	Senior Occupational Safety & Health Officer	0884451383	csgmtawali@yahoo.co.uk
2.							
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of Transport & Public Infrastructure
Date:	24/04/2018
Location:	Ministry offices, Capital Hill
Project Representative Names:	Brendon Solik & Kent Kafatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	F. NGZMBENDE	F	Buildings Department	Buildings Dept	Chief Building Services Engineer	0999512462 0888143235	ngzmbende@yahoo.com
2.	J. Mdambo	M	Buildings Department		Chief Landscape Architect	0995050444 099330652	Josephmdambo@gmail.com
3.							
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of water, Irrigation & Agriculture
Date:	24/04/2018
Location:	Ministry offices
Project Representative Names:	Brendon Solik & Kent Kutatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Gleung Phr	F	Ministry of Agr. Irr & WD	Water Supply	SCE	0999 169290	bule2ulu@gmail.com
2.	Jobulani Thado	M	"	"	SCE	0999 607447	thodeji@gmail.com
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Department of lands
Date:	24/04/2018
Location:	Department of lands, Lilongwe
Project Representative Names:	Brendon Solik & Kent Kafakia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Cynthia Chilone	f	Ministry of Lands	Department of Lands	Principal valuation ^{office}	0999493171	415372287@tues.co.zw
2.							
3.							
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DL office
VILLAGE MEETING REGISTER



Date:	25/04/2018
District:	Sulima
Location of Meeting:	DL office, Sulima
Project Representative Names:	Brendon Solik, Kent Kafotia, James Stone

	Name	Sex (M/F)	Village Head Department	Group Village Head Position	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc) Email	Telephone No
1.	Adam Jason	M	Forestry	DFO		Jason adam Sa @yahoo.com	0771022055
2.	James Chigwara	M	Environment	EDO		chigwara@ gmail.com	0991 849 880
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Government/Stakeholder –Ministry of Transport and Public Infrastructure			
Section 1: Meeting Details			
Date and time:	24/04/2018		
Full names of project representatives:	Brendon Solik Kent Kafatia		
Name of participants (name and position) – Take register:	Josephy Mdambo- Chief Landscape Archtect Flora Ngombende -Chief Building Services Engineer.		
Location:	Capital Hill, Lilongwe		
District:	Lilongwe		
No of female participants:	1	No of male participants:	3
Total no of participants:	4		
Section 2: Meeting Minutes (note key points, relevant questions, responses, quotes)			
<p>Using the Background Information Document (BID), Brendon Solik presented the proposed solar power project highlighting the proposed location of the solar farm, its size (approximately 186 hectares), and the 30 metres wide, approximately 3 to 4-kilometre-long transmission line wayleave. He highlighted the potential negative impacts including noise impacts, additional water demand and waste generation. On the other hand, potential positive impacts were said to include power availability, CSR program and employment opportunities. He mentioned that the project operation period is 20 years.</p> <p>1. Question/ comment: What are the activities that will take place for the road construction?</p> <p>In response, it was explained that the road will only be graded.</p> <p>2. Question/ comment: The Solar farm at Kamuzu International Airport (KIA) has problems of sustainability with rates (tariff). How will this be taken care of for the proposed project?</p> <p>In response to the question, the consultants reiterated that currently, the ProjectCo is discussing the tariff with the relevant authorities of government and it is hoped that they will reach an agreement soon.</p> <p>Question/ comment: Land (farmland) in Salima is an issue. Is the project intending to provide alternative land?</p>			

Government/Stakeholder –Ministry of Transport and Public Infrastructure

In response to this question, the consultants explained that the ProjectCo, local chiefs and the Salima District Council are looking into this matter to ensure that the people whose farm lands are affected, have alternative land for farming. It was noted during field investigations and consultations that there may be available alternative land near the affected communities. The consultants will also prepare a Livelihood Restoration Plan to ensure that those whose land for has been purchased are not worse off than their original state. The consultant has also prepared a Feasibility Study for Corporate Social Responsibility which includes options to improve agricultural practices.

- 3. Question/ comment:** Solar panels emit infra-red radiation. How close is the nearest habitation? What about birds being killed from above?

In response to this, the consultants explained that the solar farm will be at a safe distance from affected communities. However, the Environmental and Social Impact Assessment (ESIA) studies, will assess the visual, and health and safety impacts. Through this study, potential impacts and their appropriate mitigation measures will be identified. An environmental and social management plan will also be prepared for mitigating the adverse impacts and a monitoring plan to ensure effective implementation of the management measures will also be developed. The ESIA will be prepared in conformity with the Malawi and IFC requirements.

- 4. Question/ comment:** What will happen to the surrounding community? Will the project give them electricity?

The consultants explained that the project is designed to sell electricity to ESCOM and the power will be connected directly to the national grid through the Salima ESCOM sub-station. Hence, the communities in the project area cannot be connected directly to the solar power plant. However, the CSR feasibility study assessed rural electrification options for affected communities.

- 5. Question/ comment:** Cleaning the solar panels with water will be unethical in a place where potable water is not sufficiently available to the community. This will make the community long for the water. How does the project intend to provide water?

Investigations into impacts on water in the project area will be included in the ESIA. In addition the CSR feasibility study has investigated options to improved water and sanitation in the affected communities.

Section 3. Actions - note any actions here and who it was raised (e.g. additional information requests, grievances):

Issue Raised	Who by?	Action (s)
The project is necessary to increase production, generation,	Flora Ngombende	ERM

of the projects' activities and plans?				
<ul style="list-style-type: none"> Were you able to ask the questions that you wanted? 	Yes 2	No	Partially	Total no of responses
<ul style="list-style-type: none"> Was this meeting organised in a way to facilitate your attendance? 	Yes 2	No	Partially	Total no of responses

Section 6: Meeting Photo

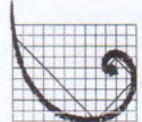




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WWEC



ERM

MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: Ministry of Transport & Public Infrastructure

Meeting Date: 24/04/18

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

⇒ The project is necessary to beef up production, generation, distribution and transmission of power in the country.

⇒ It will be important to focus on the rural electrification of the surrounding communities so that they can have direct benefits of the project.

Flora Ngombande

0999512462
24/04/18

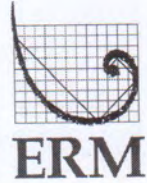




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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: Ministry of Transport & Public Infrastructure

Meeting Date: 24/04/18

• Was the meeting useful?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Were you able to ask the questions that you wanted?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

The meeting has been very fruitful and almost all concerns that we had as Buildings Department has been raised and been assured that they will be included in their report after doing all the consultations with relevant stakeholders.

J. Dando
Senior Lecturer





STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Ministry of Transport & Public Infrastructure
Date:	24/04/2018
Location:	Ministry offices, Capital Hill
Project Representative Names:	Brendon Solik & Kent Kafatia

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	F. NGZMBENDE	F	Buildings Department	Buildings Dept	Chief Building Services Engineer	0999512462 0888143235	ngzmbende@yahoo.com
2.	J. Mdambo	M	Buildings Department		Chief Landscape Architect	0995050444 099330652	josepymdambo@gmail.com
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District Stakeholder Meeting		
Section 1. Meeting Details		
Location: Salima District Council Offices		
District: Salima		
Date: 24/04/2018		
Names of Project Representatives: Itayi Nkhono (WWEC), Natasha Ezekiel (ERM), Gibson Malambo (WWEC), Jonas Sani JCM Malawi)		
No of Female Participants: 1	No of Male Participants: 8	Total number of participants: 9
Section 2: Meeting Minutes (note all relevant comments, questions, responses)		
<p>The meeting started with introductions and project briefing by Jonas Sani, followed by a presentation by Natasha Ezekiel on the project. The following are the questions and the comments that the stakeholders made:</p> <ul style="list-style-type: none"> <p>Question: Displacement of people: -it normally takes time for people to be resettled, so what are the plans to ensure affected people regain/acquire normal life? Comment: We are not expecting anyone to have to move as a result of the project. However, there may be impacts to land. As such, a Livelihood Restoration Plan will be developed that will include measures to restore livelihoods that are impacted. The LRP will include measures to find replacement land for those affected as well as implement livelihoods programmes, that may include farmer training, financial literacy training, provision of farming inputs etc. The LRP will be developed in consultation with affected communities to ensure that they are involved in the decision making process regarding the LRP.</p> <p>Question: Will the solar system include batteries? If yes how will the batteries be managed in terms of disposal? Answer: The project will not include large scale battery use.</p> <p>Question: How will the project decommission after the project period? Answer: There will be a decommissioning plan that will be shared with the communities and all concerned parties/ relevant stakeholders.</p> <p>Question: What are the examples of the community investment programs that the project will implement? Answer: The community investment programs will be based on the CSR feasibility study which has been produced. Some of the potential programs for implementation include: Renewable Energy (solar power-electrification), water and sanitation (including menstrual health) and agriculture, etc. Money has already been set aside to facilitate implementation of the programs.</p> <p>Question: What will be the mitigation measures put in place by the project to manage waste from the project site? Will the project source water from the community water sources? Answer: The project will ensure that proper waste management plans are in place and implemented accordingly. The project team is already in contact with waste management experts, local as well as government, to guide and help in managing waste from the project site. Therefore, the project will not add any pressure to the existing issues on waste management. The project will not add any pressure on the existing water sources within the communities. Instead, the project may consider drilling their own boreholes, however this depends on the findings of the geological studies.</p> <p>Question: How will the project contain the sun-ray blur from the solar panels, as these may have negative effects on the eyes of the onlookers (community members)?</p> 		

Answer: Visual impacts will be assessed in the ESIA and appropriate mitigation measures will be implemented. ProjectCo will minimize the health hazards that may be caused by the project.

- **Question:** Is there going to be any legal document on the corporate social responsibility between the project implementers and the communities or district council or the government?

Answer: It is not clear on whether there will be a formal agreement between the DC and the ProjectCo with regards to the implementation of community investment projects.

- **Question:** How will the project ensure the safety of women from sexual abuse and gender based violence from the project staff (even their husbands in the homes? Men tend to abuse women when they are economically empowered through such works; hence the fear from women)

Answer: Indeed, these are the common on capital projects. However this project has already started to establish grievance handling mechanisms for all issues related to or caused by the project. Sensitization campaigns will also be conducted in all the affected communities and those surrounding the project site. Additionally, there will be a code of conduct in place for the work force in relation to interacting with young women and the community in general.

- **Question:** The DC concluded by asking how the International/ National laws trickled down to the district and targeted communities?

Answer: In addition to the meetings already held with the communities, the project team is conducting consultations with the relevant ministries and departments. The team is also aware of the ESIA requirements and all the relevant documents that need to be reviewed for the project, in line with national requirements.

Section 3: Facilitator Observations

Insert key observations (level of participation, response to the meeting, general observations):

-

Section 4: Follow-on Actions (note actions raised during meetings)

Issue Raised	Who by?	Action

Section 5: Meeting Evaluation Feedback Process (gather oral feedback)

How many participants took part in the feedback process? 9

- All participants of the meeting participated actively.

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	9			9
• Was the information presented in a clear manner and do you feel that you have	8		1	9

a good understanding of the projects' activities and plans?				
• Were you able to ask the questions that you wanted?	Yes 9	No	Partially	Total no of responses 9
• Was this meeting organised in a way to facilitate your attendance?	Yes 9	No	Partially	Total no of responses 9

Section 6: Meeting Photo

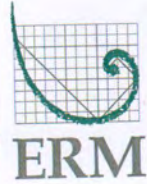




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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: Salima District

Meeting Date: 24/4/18

• Was the meeting useful?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Were you able to ask the questions that you wanted?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

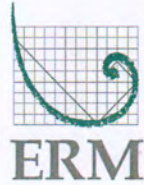
- o It was very helpful but a little bit of more information on community development Agreement and restoration plan on secondary phase.
- o Option analysis on sun ray blur is vital!!
- o A mention of environmental enhancement measures in terms of landscape and biodiversity can add value to projects



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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: SALIMA District Council

Meeting Date: 24/04/2018

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

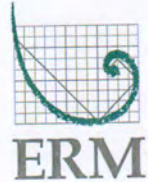
It was a very important meeting and an eye opener especially on social component to the community members.



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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: DC'S OFFICE

Meeting Date: 24/04/2018

• Was the meeting useful?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Were you able to ask the questions that you wanted?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="radio"/> Yes	<input type="radio"/> No	<input type="radio"/> Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

* YES, THERE IS NEED TO CONSIDER CSR - PACKAGE THAT WOULD HAVE POSITIVE IMPACT IN THEIR LIVES.

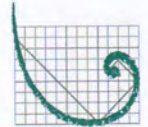
* THIS IS A WELCOME DEVELOPMENT...



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AFRICA



WVEC



ERM

MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: Salima Dc's office

Meeting Date: 24/04/18

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

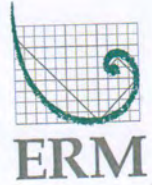
Labour and working conditions should be looked critically and Labour experts should also have access to contracts agreements, including District Commissioner.



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MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: *SARIM & DC'S OFFICE*

Meeting Date: *29/04/18*

	Yes	No	Partially
• Was the meeting useful?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Were you able to ask the questions that you wanted?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

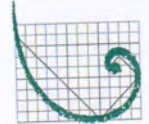
- The results for ESIA should be presented to the relevant district stakeholders before going to the central level.



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WWEC



ERM

MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: SALIMA DCs office

Meeting Date: 24/04/18

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

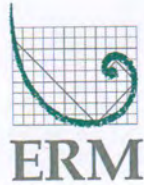
Let the engagement continue to completion of the project.



InfraCo
AFRICA



WWEC



MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: *Salima DCS office*

Meeting Date: *24/04/18*

• Was the meeting useful?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Partially <input checked="" type="checkbox"/>
• Were you able to ask the questions that you wanted?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE

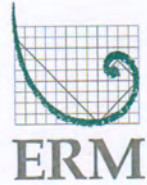
Our information presented - I suggest that you clearly define the methods to be used in offsetting the environmental hazards related to the plant. ~~but~~ In addition, the community benefits have to be clearly defined as well ~~to~~ for easy monitoring on the DC part.



InfraCo
AFRICA



WWEC



MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: DC's office - Salinas

Meeting Date: 24th April, 2018

• Was the meeting useful?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Were you able to ask the questions that you wanted?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>
• Was this meeting organised in a way to facilitate your attendance?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Partially <input type="checkbox"/>

PLEASE ADD ANY ADDITIONAL COMMENTS HERE



InfraCo
AFRICA



WWEC



ERM

MEETING FEEDBACK QUESTIONNAIRE
SCOPING ENGAGEMENT (APRIL 2018)

Meeting Location: SABIMPA DCS OFFICES

Meeting Date: 24/04/18

• Was the meeting useful?	Yes ✓	No	Partially
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes ✓	No	Partially
• Were you able to ask the questions that you wanted?	Yes ✓	No	Partially
• Was this meeting organised in a way to facilitate your attendance?	Yes ✓	No	Partially

PLEASE ADD ANY ADDITIONAL COMMENTS HERE



STAKEHOLDER MEETING REGISTER

Stakeholder Group:	Lands
Date:	26-04-2018
Location:	Salima District Council office
Project Representative Names:	Jones, Kent, Xstarks, Hui, Gibson

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Blessings Mshale	M	Salima DC	Lands	DLO	0881519355	mshale.blessings@yahoo
2.	Gregory Manda	Y	"	Lands	Assistant DLO	0995410703	-
3.	Jonathan Chikofa	Y	Department of Lands	Lands (LL)	Valuation Officer	0999374858	jchikofa@gmail.com
4.	Robert Ssekala	Y	"	"	Surveyor	0999409275	rssekala3@gmail.com
5.	Raphael Sikoti	Y	"	"	Valuation	0888057826	rapsheatrikoti@gmail.co
6.	Charles Mawembe	Y	Salima DC	DC	DC		charlesmawembe@yahoo
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STAKEHOLDER MEETING REGISTER

Stakeholder Group:	District Council.
Date:	24 April, 2018
Location:	Salima
Project Representative Names:	Jonas, Gibson, Itayi, Astasha

	Name	Sex (M/F)	Company/Organisation	Department	Position	Telephone No	Email address
1.	Lucius DOWSA	M	MoH	Environmental Health	DEHO	0999945943	luedarbydonsa@gmail.com
2.	McDirreza Chavala	M	Labour	Labour	DLO	0999422353	magchavala@yahoo.com
3.	Adam Jason	M	Forestry office	Forestry	DFO	0231022255	jasonadam52@yahoo.com
4.	Felda Mbwana	F	Social welfare	Social welfare	PSWO	0992273268	feldambwana@gmail.com
5.	D. Chogwara	M	Environment	Environmental Affairs	EDO	0991841884	chogwara@gmail.com
6.	B. Chunga	M	Comm. Dev.	Comm. Dev	DCDO	0888301940	chunga.brigham@yahoo.com
7.	KJC Mwaemba	M	SALIMA D. COUNCIL	District Council	DC	0888536823	charlesmwaemba@yahoo.com
8.	Waki Chunga	M	Water Dept	Water Dept	DWDO	0999661149	wchungu@gmail.com
9.	Blessings Mshah	M	Land SDC	Land	DLO	0995644267	mshahs.blessings@yahoo.com
10.							
11.							
12.							
13.							

Village/Community Meeting		
Section 1. Meeting Details		
Location: Kanzimbe 1		
Village Head: Kanzimbe 1		
Group Village Head: Kanzimbe 1		
Traditional Authority: Kalonga		
District: Salima		
Date: 24/04/2018		
Names of Project Representatives: Itayi Nkhono (WWEC), Natasha Ezekiel (ERM), Gibson Malambo (WWEC)		
No of Female Participants: 45	No of Male Participants: 40	Total number of participants: 85
Section 2: Meeting Minutes (note all relevant comments, questions, responses)		
<p>1. Question: The community wanted to understand where the transmission lines will pass through and the buffer zone, how they will be affected and where they will farm?</p> <p>It was explained that the wayleave for the transmission lines will have a width of 30 m. No farming activities will be allowed within the way leave under the transmission line. However, it was indicated that a more specific answer will be provided once the engineers have concluded their designs.</p>		
<p>2. Question: What are the possible health hazards, specifically from dust and waste? Will people be asked to move from their current location and be resettled to another area because of dust?</p> <p>In response, it was explained that dust will be contained and waste will be disposed of following the waste disposal guidelines from the District Council. Any hazardous waste will be removed from the EPC contractor. Dust will mainly be an issue during construction, and from vehicles transporting construction materials. It has to be noted that this will only be for a short time during construction. Appropriate measures will be put in place to mitigate dust impacts. For example, spraying dust roads. A fence will be erected to keep livestock away from the construction site and the solar farm. People will not have to be moved to new areas because of dust as this will be appropriately mitigated.</p>		
<p>3. Question: Will there be safety signs along, near or within the project site?</p> <p>It was explained that solar plants are generally safe and do not cause health issues to nearby communities. However, the electrical components involved with solar developments can be hazardous/dangerous, for example, electric shocks can happen if electrical components are handled incorrectly. As such, hazard signs and fencing will be in place to keep the public safe. Additionally, community sensitisation will be undertaken to educate communities on the risks and safety measures.</p>		
<p>4. Question: How will the project ensure women are not going to be raped (safety from sexual abuse and GBV from the project staff, even their husbands in the homes)? Men tend to abuse women when they are empowered economically through such works; hence, the fear by women.</p> <p>A worker code of conduct will be established for all its workers, including measures regarding Gender Based Violence (GBV) and any form of sexual abuse. The project has established a grievance handling mechanism for all issues related to or caused by the project. Sensitization campaigns will also be conducted in all the communities affected and surrounding the project site.</p>		

Section 3: Facilitator Observations

Insert key observations (level of participation, response to the meeting, general observations):

- The meeting started with introductions, followed by a presentation of the project by one of the project team members. During the meeting it was evident that community members were already aware of the project, including the expansion/extension of the land through sensitization meetings that were conducted by the lands officer and the local leaders.
- The representation of the community members was not poor considering that at this centre there were supposed to be approximately 2000+ people from the 5 villages in GVH Kanzimbe. The major setback was the funerals (two consecutively) that affected the concerned communities, as such most people attended the funerals than the community meeting.
- The representation of women and men was almost the same, which indicated a good sense of gender (reflected in the participants register) in the community. Youth were also part of the meeting indicating that the message was sent correctly that the meeting was for everyone in the communities and not only the PAPs.

Section 4: Follow-on Actions (note actions raised during meetings)

Issue Raised	Who by?	Action
Grievance Committee	Itayi	Establishment and finalisation of the Community GM. To incorporate other members from additional communities

Section 5: Meeting Evaluation Feedback Process (gather oral feedback)

How many participants took part in the feedback process?

- Majority of the participants including both men and women.

Insert the number of **yes, no, partially** responses to each question in the relevant box

• Was the meeting useful?	Yes			Total no of responses
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes			Total no of responses
• Were you able to ask the questions that you wanted?	Yes			Total no of responses
• Was this meeting organised in a way to facilitate your attendance?	Yes			Total no of responses

Section 6: Meeting Photo



VILLAGE MEETING REGISTER

2.

Date:	24-04-2018
District:	Solima
Location of Meeting:	GUT Kamzimbe
Project Representative Names:	Itai Gibson, Neteshe

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Seina Leonard	F	Kazimbe 2	Kazimbe 1	farmer	VSL	-
2.	Mausiyeko Sauma	F	Kazimbe 2	Kazimbe 1	farmer	VSL	-
3.	Agness Frackson	F	Kazimbe 2	Kazimbe 1	farmer	VSL	-
4.	Tereza Kawanga	F	Kazimbe 2	Kazimbe 1	farmer	-	-
5.	Ester Chatayika	F	Kazimbe 2	Kazimbe 1	farmer	VSL	-
6.	Nelia Milward	F	Mputeni	Kazimbe 2	farmer	VSL	-
7.	Yellonica Follasi	F	Kazimbe 2	Kazimbe 1	farmer	-	-
8.	Chiwondi zefeni	F	Kazimbe 2	Kazimbe 1	farmer	-	-
9.	Lamesi Innocent	F	Menyako	Kazimbe	farmer	-	-
10.	Fidina Rapherwell	F	Malezi	Kazimbe	farmer	VSL	-
11.	Lydia yakobe	F	Menyako	Kazimbe	farmer	-	-
12.	Suvana Jackson	F	Malezi 1	Kazimbe	farmer	VSL	-

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VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Mercy Madanitsa	F	Menyako	Kazimbe	famer	VST	-
14.	Nalesi Chatayika	F	Kazimbe 2	Kazimbe 1	famer	VST	-
15.	Judith Mahyo	F	Menyako	Kazimbe	famer	-	-
16.	Luncia Maloni	F	Menyako	Kazimbe	famer	VST	-
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VILLAGE MEETING REGISTER

Date:	24 April 2018
District:	Salima
Location of Meeting:	JUH KANZIMBE
Project Representative Names:	I Taji, Natasha, Sibson

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Ketina Mwaqicha	F	Jephutala	Kanzimbe	housewife	VDC Member.	
2.	Mary Reuben	F	Kanzimbe 2	Kanzimbe	farmer	VGRM member	
3.	Angela Damiano	F	Jephutala	"	farmer/hwife	Mother Group Member	
4.	Juress Luka	F	"	"	farmer.	Mbuzala Treasure School Group	
5.	Letting Samuel	F	Memyaka	"	farmer	-	
6.	Laveress Limbikani	F	Kanzimbe 1	"	farmer/H wife	Mother Group	
7.	Salome Lafiwe	F	Kanzimbe 2.	"	farmer	-	
8.	Enita Memyako	F	" 1	"	"	-	
9.	Emily Shauyu	F	Memyako	"	farmer/HW	-	
10.	Ndidapha Chimbala	F	Memyako	" 1	Farmer	-	
11.	Kutsala Chienda	F	Jephutala	" 2	farmer	VSL	
12.	Enelesi Tsite	F	Memyako	" 1	"	VSL.	

VILLAGE MEETING REGISTER

Date:	24-04-2018
District:	Salima
Location of Meeting:	GVH KANZIMBE
Project Representative Names:	Nafeshe, Itzi, Gibson

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Elenia Katcho Kani	M	Jepter	Kazimbe	Farmer	member	-
2.	Chatajka Chikima	M	Kazimbe II	"	Farmer	member	-
3.	Victor Jasi	M	Jepter	"	Tailor	member	-
4.	James Zefaniya	M	Kazimbe II	"	Farmer	Graveyard Chairman	099514698
5.	Daude LIVISON	M	Menyako	"	Farmer	member	-
6.	Rodney Kuwani	M	Kazimbe II	"	Farmer	member	0885968973
7.	SAPULEDI Chumphote	M	Kazimbe I	"	Builder	member	0993394900
8.	Willison Kadiwa	M	Kazimbe I	"	Farmer	member	-
9.	MTonga Chumzimu	M	Malezi	Mkhomo	Farmer	member	-
10.	Richard Tempo	M	Kazimbe I	Kazimbe	Farmer	member	0880170691
11.	Haward Mazengela	M	Kazimbe I	"	Farmer	member	0997195790
12.	Eston Kingford	M	Jepter	"	Farmer	member	0991711386



VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Hamilton Lemon	M	Menyako	Kazimbe	Carpenter	member	0995116362
14.	Chibvutiso Mbangale	M	"	Kazimbe	Farmer	"	-
15.	Maulina Ichaka	M	"	"	Farmer	"	-
16.	Gerald Thomas	M	Malezi	"	Farmer	Village Bank Chairman	-
17.	Mackdonad Daison	M	Kazimbe II	"	Bicycle Hires	Member	-
18.	Chipirino Medson	M	Malezi	"	Farmer	Member	-
19.	Thokozam Lameck	M	Kazimbe II	"	Farmer	member	-
20.	Mabvuto Kenes	M	"	"	farmer	member	-
21.	William Keness	M	"	"	Carpenter	member	0998638110
22.	Johane Sauzande	M	Mayambo	Mayambo	Farmer	member	-
23.	Shaibu Bikozi	M	Kazimbe I	Kazimbe	Farmer	Member	-
24.	Moses Matias	M	Kazimbe II	"	Farmer	member	-
25.	Sewelo Andson	M	Kazimbe I	"	Farmer	member	-
26.							
27.							

VILLAGE MEETING REGISTER

Date:	24-04-2018
District:	Solwe
Location of Meeting:	GVH KANZIMBE
Project Representative Names:	GIBSON MALAMBO, ITAI NKHONDO, NATASHA IZIKIEL

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Sungu Milieni	M	Kanzimbe 2	Kanzimbe 2	Farmer	G. village head	-
2.	Lekedds Chudak	M	Molezi	Molezi	Farmer	G. village head	-
3.	Raden Chigole	M	VH Jepatata	Kanzimbe 2	Farmer	village head	0997740726
4.	Mlekana Betisi	M	Kanzimbe 1	Kanzimbe 1	Farmer/business	GVH	0991536037
5.	Betisi Sijeri	M	Menyaka	Kanzimbe 1	farmer	village head	0995489047
6.	Christie Larnad	F	VH Kanzimbe	Kanzimbe 1	farmer	V. H	0995479095
7.	Ireen Miliward	F	Mpsteri	Kanzimbe 1	farmer	V. H	-
8.	Lachi Kaduz	M	Kanzimbe 1	Kanzimbe 1	farmer	V. H	-
9.	Rosind Derson	M	Kanzimbe 2	Kanzimbe 2	farmer	Member	-
10.	Luvion Chudambis	M	Jepatata	Kanzimbe 2	Farmer	Member	099661813
11.	Robert Dimosi	M	Kanzimbe 2	Kanzimbe 2	farmer	Member	-
12.	Kase Charles	M	Kanzimbe 2	Kanzimbe 2	farmer	member	-

VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Chimwembe lende	M	Mkleri	Mkhomo	farmer	Member	099 23 9310
14.	Kalisti lende	M	Kanzembe 2	Kanzembe 2	farmer	member	-
15.	Kalisti Chimwembe	M	Mkleri	mkhomo	farmer	member	-
16.	Julias Banda	M	Kanzembe 1	Kanzembe 1	farmer	member	-
17.	Millward Chikwa	M	Kanzembe 1	Kanzembe 1	farmer	member	-
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Village/Community Meeting		
Section 1. Meeting Details		
Location: Mayambo		
Village Head: Mayambo		
Group Village Head: Mayambo		
Traditional Authority: Kalonga		
District: Salima		
Date: 25/04/2018		
Names of Project Representatives: Itayi Nkhono (WWEC), Natasha Ezekiel (ERM), Gibson Malambo (WWEC), Kent Kafatia (WWEC)		
No of Female Participants: 46	No of Male Participants: 44	Total number of participants: 90
Section 2: Meeting Minutes (note all relevant comments, questions, responses)		
<ul style="list-style-type: none"> The chief started by welcoming the project team indicating that the project team was here to discuss the project. He indicated community members have asked about the project impacts, including resettlement and possible health hazards. He therefore encouraged all the participants in the meeting to ask all the questions and concerns they may have. The communities wanted to understand if there will be any emissions from the project site, which could affect their health and climate change? – It was explained that a solar energy plant/system is an environment and climate friendly technology. As such, there will be no emissions from the project during operations. During construction there will be emissions but maximum care will be taken to reduce such emissions and impact on the people. The GVH also asked, on behalf of the people, if the communities will benefit from the electrification program. – In response, it was explained that the electricity that will be generated from the site will be fed into the national grid. Therefore there will be no direct connections from the plant into the communities. However, it was emphasized that through the project, they will be implementing a series of community investment programmes which may focus on rural electrification. Another Village Head asked about what will happen to the livestock they have, which use the project site for grazing- The response was that the project site will be fenced as such no livestock will have access to the project site once construction has commenced. However, this will be addressed in a Livelihood Restoration Plan (LRP) to ensure that alternative grazing area are identified and that appropriate measures are established to avoid impacts to grazing. Will the project create job opportunities for the community members? How will the welfare and contractual agreements of the workers be handled? In response the project team said yes the project will create job opportunities for the community members, primarily during the construction phase. However this is dependant on their skills and capabilities. It was also emphasized that there will be some posts that will require special skills or knowledge. As such, there will be other employees' from outside the communities (may be even outside the country) depending on their experiences, knowledge and skills. As for contractual obligations, it was explained that the project will follow the Malawi labour laws when recruiting workers and the welfare of these workers will be in accordance with the laws. The project will always make sure that the workers are not oppressed and that the agreed contracts are always being followed. 		

- Where will the construction team for the project be sourcing water for use/drinking? - In response, it was mentioned that the Project will construct new boreholes for their use. An investigation into groundwater availability will be done prior to construction the boreholes. During operations the occasional cleaning of solar panels may result in increased runoff to areas surrounding the Project Site and in view of this, appropriate drainage will be included in the design for the Project. It was also added that through the community investment programs, the project may consider the options for providing water to the communities as determined during the baseline studies.
- The community wanted to understand where the transmission line will pass and the width of the way leave, they also wanted to know how this will affect them and their cropland – In response, it was explained that the wayleave for the transmission lines will have a width of 30 m. No farming activities will be allowed within the way leave under the transmission line.
- What are the possible health hazards, specifically from dust and waste from the project activities? Will people have to be resettled to new areas because of dust? – In response, it was explained that dust will be contained and waste will be disposed of following the waste disposal guidelines from the District Council. Any hazardous waste will be removed from the EPC contractor. Dust will mainly be an issue during construction, and from vehicles transporting construction materials. It has to be noted that this will only be for a short time during construction. Appropriate measures will be put in place to mitigate dust impacts. For example, spraying dust roads. A fence will be erected to keep livestock away from the construction site and the solar farm. People will not have to be moved to new areas because of dust as this will be appropriately mitigated.
- The meeting ended with comments and closing remarks by the chief that he was glad that the project team explained and answered the questions and concerns of the people in his community. Additionally he thanked the community members for asking constructive questions that helped everyone to understand the project much better.

Section 3 Insert key observations (level of participation, response to the meeting, general observations):

- The meeting started with introductions, followed by a presentation of the project by one the project team members. From observation the majority of the community members were not aware of the project details as well as details for the additional land.
- The representation of participants was not a good reflection of the communities from which they came from. There were fewer participants than expected, this was mainly the case due to the wrong information that was sent in the communities. The message that got to the GVH Mayambo was that only PAPs were needed, which was contrary to the true message which was to arrange for a meeting for all community members. As such the meeting started late as the messages for calling everyone had to be sent again. Hence, others joined while the meetings/presentation had already started. However there were posters noticed in the community indicating the date, time, and venue of the meeting.
- The representation of women and men was almost the same which indicated a good gender balance (reflected in the participants register) in the community. Youth were also part of the meeting.

Section 4: Follow-on Actions (note actions raised during meetings)

Issue Raised	Who by?	Action

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Section 5: Meeting Evaluation Feedback Process (gather oral feedback)

How many participants took part in the feedback process?

- Majority of the participants including both men and women.

Insert the number of yes, no, partially responses to each question in the relevant box

• Was the meeting useful?	Yes			Total no of responses
• Was the information presented in a clear manner and do you feel that you have a good understanding of the projects' activities and plans?	Yes			Total no of responses
• Were you able to ask the questions that you wanted?	Yes			Total no of responses
• Was this meeting organised in a way to facilitate your attendance?	Yes			Total no of responses

Section 6: Meeting Photo



VILLAGE MEETING REGISTER



Date:	25 April 2018
District:	Salima
Location of Meeting:	Mayamba
Project Representative Names:	Hmi, Natash, Kent, Gibson.

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	bebina Demsoni	F	NJolha	mayamba	mayamba	USL	
2.	sofiyo Katiyo	F	NJolha	"	"	TOP UP USL	
3.	Sipening YRISA	F	mayamba	"	"	-	
4.	Faida Fakka	F	NJolha	"	"	-	
5.	Lenza chipundo	F	kahiti	"	farmer	TOP UP USL	
6.	Yesingi Lafimani	F	kahiti	"	farmer	-	
7.	Maqalesi mysa	F	NJolha	"	farmer	-	
8.	Losina Jernala	F	NJolha	"	farmer	TOP UP USL	
9.	aines, gifiti	F	NJolha	"	farmer	TOP UP USL	
10.	mese machilika	F	mayamba	"	farmer	POP UP USL	
11.	Yenifa mwencholo	F	chishasha	"	farmer	-	
12.	GILESI nepiyala	F	kachepela	"	farmer	-	

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VILLAGE MEETING REGISTER



	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Lozi Liza Tumbhe	f	mayambo				
14.	Yemile Zenas	f	Kachepele	mayambo	farmer	TOP UP	
15.	Bhilisizina Kadango	f	mayambo	mayambo	farmer	-	
16.	Mhilise Yosefe	f	mayambo	-	farmer	-	
17.	Lozi peniyasi	f	chishasha	-	farmer	-	
18.	Munipenti chepang	f	mayambo	-	farmer	baki	
19.	Selina Tulayi	f	mayambo	-	farmer	-	
20.			mayambo	-	farmer	-	
21.							
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VILLAGE MEETING REGISTER


Date:	25 April 2018
District:	Salima
Location of Meeting:	Mayambo
Project Representative Names:	Itayi, Natasha, Kent, Gibson.

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Akello Mazombwe	F	Mayambo	Mayambo	Farmer	VSL / Chienda	
2.	Milka Kachepa	F	Njoka	"	Farmer	-	
3.	Zione Charles	F	Chishasha	"	Housewife	Kitchen Top-Up	
4.	Limange Positani	F	Chishasha	"	"	Kitchen Top-Up	
5.	Christina Charles	F	Njoka	"	Farmer/Housewife	VSL	
6.	Agnes Jackson	F	"	"	"	Community Health Com-	
7.	Violet John	F	"	"	Housewife	-	
8.	Bertha Charles	F	Mayambo	"	"	Tivhelone kitchen Top-Up	
9.	Christina Bellum	F	Njoka	"	"	VSL Top-Up	
10.	Stella Gevinda	F	Chishasha	"	Housewife	VSL Top-Up	
11.	Pilliani Malisen	F	Mayambo	"	"	-	
12.	Loster Elisa	F	"	"	"	Top-Up	

VILLAGE MEETING REGISTER



	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Violet Alexander	F	Kantiti	Mayambo	housewife	VSL	
14.	Elena Nkhona	F	Mayamba	"	"	Top-Up, VSL	
15.	Ellube Kashoni	F	"	"	"	VSL	
16.	Toumange Kanda	F	"	"	"	-	
17.	Melesia Chifundo	F	Kantiti	"	Farmer	-	0992910303
18.	Kabeka matilhi	f	mambo	"	farmer	-	
19.	Sitela Sifulan ton	f	mayambo	"	bati	-	
20.	Yidipafu yediwedi	f	mayambo	"	Farmer	-	
21.	Maiya Peniyasi	F	mayambo	"	Farmer	-	
22.	Maiya Jakisoni	F	Joka	"	farmer	TO UP VSL	
23.	Liginisi tiwaps	F	Joka	"	farmer	baki	
24.	Pospyi timoni	F	Joka	"	Farmer	VSL	
25.	Lifireti Jaji	F	Joka	"	Farmer	VSL	
26.	Jotipa Limwila	f	chishasha	"	Farmer	VSL	
27.	Sofeleki Jemusi	F	Joka	"	Farmer	VSL	

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VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Maling Lemuwa	M	Chushasha	Mayamba	Farmer	Member	-
14.	Amor Gison	M	Mayamba	Mayamba	farmer	Member	-
15.	Lauran Kalimbaka	M	Mayamba	Mayamba	farmer	Member	-
16.	Gonzoi Jeremiah	M	Mayamba	Mayamba	farmer	Member	-
17.	Rayben Godfrey	M	Chushasha	"	farmer	Member	-
18.	Steven Maxwell	M	Chushasha	"	farmer	Member	-
19.	Betwell Basile	M	Chushasha	Mayamba	Farmer	VH	-
20.	Art						
21.							
22.							
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25.							
26.							
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VILLAGE MEETING REGISTER

Date:	25-04-2018
District:	Salima
Location of Meeting:	Mayambo
Project Representative Names:	Kent, Natasha, Hui, Eibon

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Dinesi Tumbwe	M	Mayambo	Mayambo	GVT farmer	GVT	098240141
2.	April Chinkuzi	M	Xigoks	Mayambo	farmer	VH	0998058514
3.	Maria Chifundo	F	Kanthubi	Mayambo	farmer Housewife	VH	099824692
4.	Lionel Gulube	M	Mayambo	Mayambo	farmer	Member	-
5.	Yosefe Lemsi	M	Mayambo	Mayambo	farmer	Member	-
6.	Letek Makombi	M	tekesoni	Maong	farmer	Member	-
7.	Hiss Jonesi	M	Mayambo	Mayambo	farmer	Member	0998059599
8.	John Garizani	M	Mayambo	Mayambo	farmer	Member	-
9.	Foster Zizani	M	chishusha	Mayambo	farmer	Member	-
10.	Chikondi Kapanda	M	Xigoks	Mayambo	farmer	Member	-
11.	Kumedi Makombi	M	Mayambo	Mayambo	farmer	Member	-
12.	Frank Greccan	M	Mayambo	Mayambo	farmer	Member	-



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JCM

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WWEC



ERM

VILLAGE MEETING REGISTER

Date:	25-04-2018
District:	Selim
Location of Meeting:	Mayambo
Project Representative Names:	Gibson, Kest, Natasha, Itai

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Tikalipo Bisalom	M	Njoka	Mayambo	Farmer	member	0998630118
2.	Shema Batson	M	Kanchepele	"	Farmer	member	-
3.	Fabiano Chifundo	M	Kanthiti	"	Farmer	member	-
4.	Blessing Timothy	M	"	"	Farmer	member	0999401121
5.	Leeten Chifundo	M	"	"	Farmer	member	-
6.	Wisky Timothy	M	Njoka	"	Farmer	member	-
7.	Lefan Lemusi	M	Mayambo	"	Farmer	member	-
8.	Chitwe Frem	M	Njoka	"	Farmer	member	-
9.	Lyford Timothy	M	Njoka	"	Farmer	member	0998207688
10.	Steven Iype	M	"	"	Farmer	member	0993032758
11.	Eliza Symon	M	"	"	Farmer	member	0884852337
12.	Charles Malosen	M	Mayambo	Mayambo	Farmer	member	-

(3)

VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Fatsen Jumbo	M	Mayambo	Mayambo	Farmer	member	—
14.	Thokoza Tiwoya	M	Njoka	Mayambo	Farmer	member	—
15.	Zenas Lemson	M	Mayambo	Mayambo	Farmer	member	—
16.	Thomas Kadango	M	Mayambo	Mayambo	Farmer	Assitant V.H.	0996416944
17.	Governer Mailos	M	Mayambo	Mayambo	Farmer	member	—
18.	Ganzan Matias	M	Mayambo	"	Carpenter	member	0997758705
19.	Jonathan Timoya	M	Chishasha	"	Farmer	member	—
20.	Jeremias Shemq	M	Kanchepele	Mayambo	Farmer	member	0992228588
21.	Ester Jakulo	M	Njoka	Mayambo	Farmer	member	—
22.	Mastone Banda	M	Kanchepele	Mayambo	Farmer	V.H. Kanchepele	0992868655
23.	Madalitsa Samson	M	Njoka	"	Farmer	member	0998379349
24.	Size Honda	M	Njoka	"	Farmer	member	0993892254
25.	Helbert Chioza	M	Mayambo	Mayambo	Farmer	member	0998787727
26.	siatijele Kostani	M	Njoka	Mayambo	Farmer	member	—
27.							

District Stakeholder Meeting		
Section 1. Meeting Details		
Location: Salima District Council Offices		
District: Salima		
Date: 24/04/2018		
Names of Project Representatives: Itayi Nkhono (WWEC), Natasha Ezekiel (ERM), Gibson Malambo (WWEC), Jonas Sani JCM Malawi)		
No of Female Participants: 1	No of Male Participants: 8	Total number of participants: 9
Section 2: Meeting Minutes (note all relevant comments, questions, responses)		
<p>The meeting started with introductions and project briefing by Jonas Sani, followed by a presentation by Natasha Ezekiel on the project. The following are the questions and the comments that the stakeholders made:</p> <ul style="list-style-type: none"> <p>Question: Displacement of people: -it normally takes time for people to be resettled, so what are the plans to ensure affected people regain/acquire normal life? Comment: We are not expecting anyone to have to move as a result of the project. However, there may be impacts to land. As such, a Livelihood Restoration Plan will be developed that will include measures to restore livelihoods that are impacted. The LRP will include measures to find replacement land for those affected as well as implement livelihoods programmes, that may include farmer training, financial literacy training, provision of farming inputs etc. The LRP will be developed in consultation with affected communities to ensure that they are involved in the decision making process regarding the LRP.</p> <p>Question: Will the solar system include batteries? If yes how will the batteries be managed in terms of disposal? Answer: The project will not include large scale battery use.</p> <p>Question: How will the project decommission after the project period? Answer: There will be a decommissioning plan that will be shared with the communities and all concerned parties/ relevant stakeholders.</p> <p>Question: What are the examples of the community investment programs that the project will implement? Answer: The community investment programs will be based on the CSR feasibility study which has been produced. Some of the potential programs for implementation include: Renewable Energy (solar power-electrification), water and sanitation (including menstrual health) and agriculture, etc. Money has already been set aside to facilitate implementation of the programs.</p> <p>Question: What will be the mitigation measures put in place by the project to manage waste from the project site? Will the project source water from the community water sources? Answer: The project will ensure that proper waste management plans are in place and implemented accordingly. The project team is already in contact with waste management experts, local as well as government, to guide and help in managing waste from the project site. Therefore, the project will not add any pressure to the existing issues on waste management. The project will not add any pressure on the existing water sources within the communities. Instead, the project may consider drilling their own boreholes, however this depends on the findings of the geological studies.</p> <p>Question: How will the project contain the sun-ray blur from the solar panels, as these may have negative effects on the eyes of the onlookers (community members)?</p> 		

Answer: Visual impacts will be assessed in the ESIA and appropriate mitigation measures will be implemented. ProjectCo will minimize the health hazards that may be caused by the project.

- **Question:** Is there going to be any legal document on the corporate social responsibility between the project implementers and the communities or district council or the government?

Answer: It is not clear on whether there will be a formal agreement between the DC and the ProjectCo with regards to the implementation of community investment projects.

- **Question:** How will the project ensure the safety of women from sexual abuse and gender based violence from the project staff (even their husbands in the homes? Men tend to abuse women when they are economically empowered through such works; hence the fear from women)

Answer: Indeed, these are the common on capital projects. However this project has already started to establish grievance handling mechanisms for all issues related to or caused by the project. Sensitization campaigns will also be conducted in all the affected communities and those surrounding the project site. Additionally, there will be a code of conduct in place for the work force in relation to interacting with young women and the community in general.

- **Question:** The DC concluded by asking how the International/ National laws trickled down to the district and targeted communities?

Answer: In addition to the meetings already held with the communities, the project team is conducting consultations with the relevant ministries and departments. The team is also aware of the ESIA requirements and all the relevant documents that need to be reviewed for the project, in line with national requirements.

Section 3: Facilitator Observations

Insert key observations (level of participation, response to the meeting, general observations):

-

Section 4: Follow-on Actions (note actions raised during meetings)

Issue Raised	Who by?	Action

Section 5: Meeting Evaluation Feedback Process (gather oral feedback)

How many participants took part in the feedback process? 9

- All participants of the meeting participated actively.

Insert the number of yes, no, partially responses to each question in the relevant box

	Yes	No	Partially	Total no of responses
• Was the meeting useful?	9			9
• Was the information presented in a clear manner and do you feel that you have	8		1	9

a good understanding of the projects' activities and plans?				
• Were you able to ask the questions that you wanted?	Yes 9	No	Partially	Total no of responses 9
• Was this meeting organised in a way to facilitate your attendance?	Yes 9	No	Partially	Total no of responses 9

Section 6: Meeting Photo



VILLAGE MEETING REGISTER

Date:	25.04.18
District:	Silima
Location of Meeting:	Nangwaka
Project Representative Names:	Brandon, Ntsho, Itai, Sibem

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
		FEMALES					
1.	Ahnesi Zkalia		MTOLO	KAZIMBE	QUARRY STONE	MEMBER	
2.	Estere Byson		WAYA 1	KAZIMBE	FARMER	MEMBER	
3.	Xalet Sinkaziwa		SANHE	KAZIMBE	FARMER	MEMBER	
4.	Telera Lefinawo		SANHE	KAZIMBE	FARMER	MEMBER	
5.	Dorothy Byson		WAYA 1	KAZIMBE	FARMER	MEMBER	
6.	Lerina Mwanadi		WAYA 1	KAZIMBE	FARMER	MEMBER	
7.							
8.							
9.							
10.							
11.							
12.							

VILLAGE MEETING REGISTER

Date:	25-04-18
District:	Selima
Location of Meeting:	Nanyoko
Project Representative Names:	Natasha, Brando, Kant, Uzi, Gibson

	Name	Sex (M/F) FE MALES	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Estere Kingst		WAYA WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
2.	Fatsami Kanyambo		SAWIHE	KAZIMBE	PIECE WORKS	MEMBER	
3.	Patrica Byson		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
4.	Afress Elsa		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	099 3696608
5.	Fanasiya Xabuts		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
6.	Glady's Chirwa		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	099 4286 496
7.	Xahita Suluma		SAWIHE	KAZIMBE	PIECE WORKS	MEMBER	
8.	Liness Jimsu		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
9.	Chesi Zareyu		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
10.	Fanny Ganeti		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
11.	Nacy Kamwanda		WAYA 1	KAZIMBE	FARMER	MEMBER	
12.	Koisa James		SADZU	✓ HANGANI	PIECE WORKS	MEMBER	

VILLAGE MEETING REGISTER

Date:	25-04-18
District:	Salima
Location of Meeting:	Namjoka
Project Representative Names:	Gibson, Ntshos, Kent, Uai, Brandon

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
		F FEMALE					
1.	Dorothy Chimbwa		SANJHE	KAZIMBE	FARMER	M MEMBER	
2.	Grace Banda		SANJHE	SANJHE	FARMER	M MEMBER	
3.	Stelia Hezeuig		SANJHE	KAZIMBE	FARMER	M MEMBER	
4.	Ila Amiyani		WAYA 1	KAZIMBE	FARMER	M MEMBER	
5.	Tereza Masunde		SANJHE	KAZIMBE	FARMER	M MEMBER	
6.	Jeaney Chirwa		WAYA 1	KAZIMBE	FARMER	M MEMBER	
7.	Lucia Mdalemba		WAYA 1	KAZIMBE	FARMER	M MEMBER	
8.	Regina Musamadi		WAYA 1	KAZIMBE	FARMER	M MEMBER	
9.	Joice Kalulu		WAYA 1	KAZIMBE	FARMER	M MEMBER	
10.	Lucia Lafunawo		SANJHE	KAZIMBE	FARMER	M MEMBER	
11.	Xiness Jonasi		SANJHE	KAZIMBE	FARMER	M MEMBER	
12.	Iezita Kanyemba		WAYA 1	KAZIMBE	FARMER	M MEMBER	

(7)

VILLAGE MEETING REGISTER

Date:	25-04-2018
District:	Salima
Location of Meeting:	Nanyoka
Project Representative Names:	Netshe, Uzi, Kent, Gibson, Brandon

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
		FEMALES					
1.	Galdys Beniasi		THANGANI	SAZI	FARMER	MEMBER	
2.	Stella Chisulo		SAWHE	KAZIMBE	FARMER	V.D.C	0884116350
3.	Lucy Gibson		WAYA 1	KAZIMBE	FARMER	MEMBER	8995626413
4.	Madalé Elisa		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
5.	Mahita James		WAYA 1	KAZIMBE	FARMER	MEMBER	
6.	Inelesi Kahulu		WAYA 1	KAZIMBE	FARMER	MEMBER	
7.	Lidziness Kadimanga		WAYA 1	KAZIMBE	FARMER	MEMBER	
8.	Keness Lyson		MHLO	KAZIMBE	FARMER	MEMBER	
9.	Famesi Frank		SAWHE	KAZIMBE	FARMER	MEMBER	
10.	Emily Nyuliyeti		MHLO	KAZIMBE	FARMER	MEMBER	
11.	Inilna Chikoya		WAYA 1	KAZIMBE	FARMER	MEMBER	099 7174261
12.	Maria Chimutha		WAYA 1	KAZIMBE	FARMER	MEMBER	099 3070002

VILLAGE MEETING REGISTER

Date:	25-04-18
District:	SALIMA
Location of Meeting:	Nangoska
Project Representative Names:	Ntshha, Itai, Kent, Gibson, Brandon

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
		FEMALES					
1.	Manesi Bikoro		WAYA 1	KAZIMBE	FARMER	Councillor	
2.	Rodha Chilamba		SANIHE	KAZIMBE	FARMER	MEMBER	
3.	Vaillet Tomasi		SANIHE	KAZIMBE	FARMER	MEMBER	
4.	Felsta Sakhot		NYTOLA	KAZIMBE	FARMER	Councillor	
5.	Leksna Waxson		WAYA 1	KAZIMBE	FARMER	MEMBER	
6.	Linda Tadeyo		WAYA 1	KAZIMBE	FARMER	MEMBER	
7.	Merika Charles		SANIHE	KAZIMBE	FARMER	MEMBER	
8.	Miriyu Denu		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
9.	Emma Mhosi		WAYA 1	KAZIMBE	PIECE WORKS	MEMBER	
10.	Lekeleni Chilamba		SANIHE	KAZIMBE	PIECE WORKS	MEMBER	
11.	Nzwani Baswelo		WAYA 1	KAZIMBE	QUARRY STONE	MEMBER	
12.	Xolwa Harisson		WAYA 1	KAZIMBE	QUARRY STONE	MEMBER	

VILLAGE MEETING REGISTER

Date:	25-04-18
District:	SALIMTA
Location of Meeting:	NANJOUA
Project Representative Names:	Hau, Gibson, Kent, Natasha, Brandon

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	H. KUMBANDE	M	WAYA 1	KANZIMBE	HSA	MEMBER	0999125833
2.	G.V.H MAYAMBO	M	MAYAMBO	MAYAMBO	VILLAGE HEADMAN	VILLAGE HEAD	0998240141
3.	G.V.H KOSO	M	KOSO	KOSO	V-H	V-H	0997085610
4.	V-H MWAPE	M	MWAPE	KANZIMBE	V-H	V-H	0992174591
5.	G.V.H SADZU	M	SADZU	SADZU	V-H	V-H	0881751244
6.	G.V.H VUNGUTI	M	VUNGUTI	VUNGUTI	DRIVER	V-H	0998274337
7.	V-H MALUMBULA	M	MALUMBULA	VUNGUTI	FARMER	V-H	0993246735
8.	V-H MTOLO	M	MTOLO	KANZIMBE	FARMER	V-H	
9.	G.V.H WAYA 1	M	WAYA 1	WAYA 1	FARMER	V-H	0880034774
10.	V-H SANTE	M	SANTE	KANZIMBE	FARMER	V-H	0993071042
11.	V-H MICHEMBO	M	MICHEMBO	MALES1	FARMER	V-H	0998349533
12.	JOSEPH JOHN	M	WAYA 1	WAYA 1	FARMER	MEMBER	

(10)

VILLAGE MEETING REGISTER

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	S - MASIMBE	M	THANGANI	SADZU	FARMER	MEMBER	0881666050
14.	V-H CHIWAHA	M	CHIWAHA	GOLU GOLU	FARMER	V-H	0995490134
15.	M. CHISAKA GV-H MVUNGUTI	M	MVUNGUTI	MVUNGUTI	FARMER	MEMBER	0995493135
16.	N - CHEDULANI	M	SANTE	KANZIMBE	FARMER	MEMBER	0993764513
17.	S - CHATSIKA	M	WAYA 1	WAYA 1	FARMER	MEMBER	0
18.	Y - MBENDELA	M	MPUTENI	KANZIMBE	BUILDER	V-H	0886877100
19.	W : CHAVUNGA	M	WAYA 1	WAYA 1	FARMER	MEMBER	0884025241
20.	C - VICTOR	M	MITOLO	MALIZI	BUSINESS	MEMBER	
21.	P - LEXION	M	WAYA 1	WAYA 1	FARMER	MEMBER	0999947079
22.	J - LOBEN	M	SANTE	KANZIMBE	FARMER	MEMBER	
23.	D - RICHMAN	M	SADZU	SADZU	FARMER	MEMBER	
24.							
25.							
26.							
27.							

VILLAGE MEETING REGISTER

Date:	25-04-2018
District:	Salima
Location of Meeting:	Nanjoka
Project Representative Names:	Mr Brandon, Ntokohe, Kant, Gibson

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Eferema Juwao	M	Santhé	Kanzimbe	Watchman	member	0882335407
2.	Edward Chilemba	M	"	"	Farmer	member	-
3.	Skylford Gilo	M	Kanzimbe	"	Farmer	member	-
4.	Lyson Ngamasauka	M	Mtolo	Malezi	Farmer	"	-
5.	Luster Jones	M	Wayq I	Kanzimbe	"	"	0884310234
6.	Desaya Kanchoke	M	Mtolo	Malezi	"	"	-
7.	Kingsley M. Singa	M	Wayq I	Kanzimbe	"	"	-
8.	Pickson Benson	M	Wayq I	"	"	"	-
9.	ABOBO Fulatia	M	"	"	"	"	099596242
10.	Edward Boxen	M	Santhé	"	"	"	-
11.	Peter Kamnika	M	Malumbila	Sadzq	"	"	-
12.	Kamukani Cobra	M	Wayq I	Kanzimbe	"	"	0991402225

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VILLAGE MEETING REGISTER

Date:	25-04-2018
District:	Schme
Location of Meeting:	Nanyuki
Project Representative Names:	Motshhe Brandon, Uru Gibson, Kant

	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
1.	Joseph Kosmas	M	Santhe	Kanzimbe	Teacher	Member	0999453033
2.	Complex Flackson	M	"	"	Builder	"	0994219063
3.	Levison Enoch	M	"	"	"	"	0991339114
4.	Jackson Banda	M	Wayg I	"	Business	"	0993071079
5.	Josca Mizeck	M	Chumbamba Sadzy	Sadzy	Farmer	"	0884830524
6.	Lucas Lameck	M	Mhola	Kanzimbe	Driver	"	0880887501
7.	Alexander Namaona	M	Wayg I	"	Farmer	"	0996167752
8.	German Zakeya	M	Mhola	"	Business	"	0995906161
9.	Hastings Mangle	M	Wayg I	"	Teacher	"	0882643629
10.	John Ezekiel	M	"	"	Carpenter	"	0998207685
11.	Rashid Enoch	M	"	"	Farmer	"	0999422724
12.	Wedson Dickman	M	Chikwakwa	Sadzy	"	"	—

VILLAGE MEETING REGISTER



	Name	Sex (M/F)	Village Head	Group Village Head	Job Title (eg farmer, teacher, housewife etc)	Role in the community (eg village head, youth leader, chairlady, member etc)	Telephone No
13.	Masauko George	M	Waya I	Kanzimbe	Carpenter	Member	0999701546
14.	Maziso Sandford	M	Malezi	"	Farmer	"	-
15.	Stephano Magwira	M	Mtoto	"	"	"	-
16.	Mateya German	M	Sadzi	Sadzi	"	"	0995895104
17.	Makalo Vukwe	M	Waya	Waya	Farmer	Member	-
18.	Erack Sante	M	Sante	Malezi	Farmer	Member	099584885
19.	Charles Sani	M	"	"	Farmer	Member	-
20.	Sonke Kamwe	M	Waya I	Waya	Farmer	Member	-
21.	Ukudala Chimbale	M	Sante	Malezi	Farmer	Member	-
22.	Timothy Tambo	M	Waya I	Waya	Farmer	Member	-
23.	Lameck Lucas	M	"	"	Farmer	"	0992254215
24.	Josias Pambor	M	"	"	Farmer	"	-
25.							
26.							
27.							

(2)

Meeting Notification

Salima Solar Project

This is a notification to please attend a meeting in relation to an Environmental and Social Impact Assessment (ESIA) for a solar photovoltaic (PV) project in Kanzimbe Group Village, Kalonga Traditional Authority, Salima District.

The project is being developed by JCM Matswani Solar Corp Limited, a limited liability corporation in Malawi owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited and Matswani Capital (PTY) Limited.

Your views are very important to us.

Meeting details

Date:

Time:

Location:



If you require further information on the project or have any questions, please contact:

Name: Precious Chaponda

Phone number: 0888498862

Email: preciouschaponda@yahoo.com

Website: <http://www.jcmpower.ca/>



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AFRICA

Salima Solar Project

Mukuitanidwa ku nsonkhano wokambilana za m'mene chitukuko (pulojekiti) cha kupanga magetsi kuchokera ku dzuwa chingadzakhudzile za chilengedwe ndi umoyo wa anthu (Environmental and Social Impact Assessment) m'mdera la mfumku Kanzimbe, mfumu yaikulu Kalonga, kuno ku Salima.

Pulojekiti imeneyi akuyibweretsa ndi a JCM Matswani Solar Corp Limited, kampani yokhazikitsidwa ndi malamulo a muno m'Malawi, imene eni ake ndi gulu la JCM Power, InfraCo Africa Limited ndi Matswani Capital (PTY) Limited

Bwerani tidzagawane Nzeru ndi maganizo anu amene ali a mtengo wapatali ndi wotheadiza dziko pa chitukukochi.

Ndondomeko ya Nsonkhano

Tsiku:

Nthawi:

Malo:



Ngati mungafune kudziwa zambiri kapena ngati muli ndi funso imbani foni kapena pangani email ku:

Dzina: Precious Chaponda

Nambala ya foni: 0888498862

Email: preciouschaponda@yahoo.com

Website: <http://www.jcmpower.ca/>

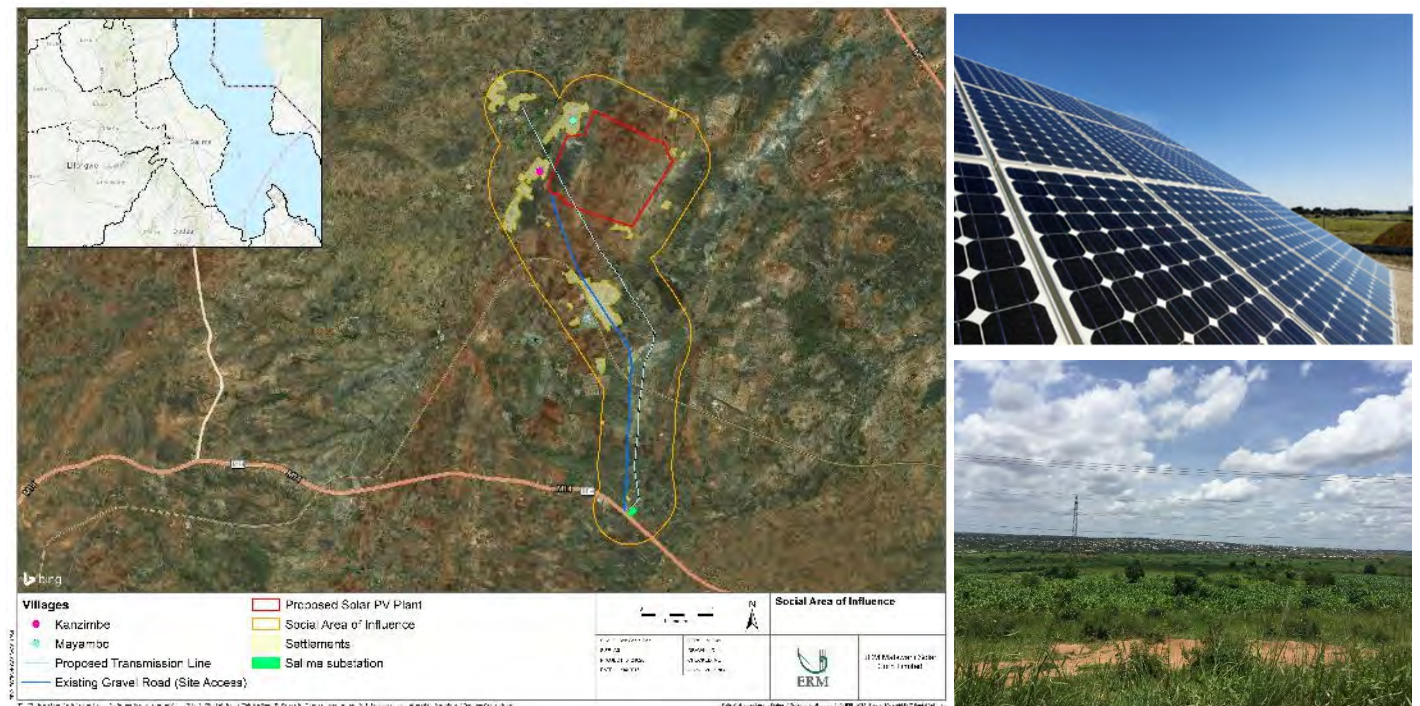


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Salima Solar Development Project: Msonkhano wodziwitsa anthu za Pulojekiti

Pulojekitiyi Mwachidule: JCM Matswani Solar Corp Limited (JCM) ndi kampani imene inakhazikidwa m'Malawi pa m'gwirizano wa makampani a JCM Power, InfraCo Africa Limited ndi Matswani Capital (PTY) Limited (m'gwilizanowu ukutchedwa 'ProjectCo').

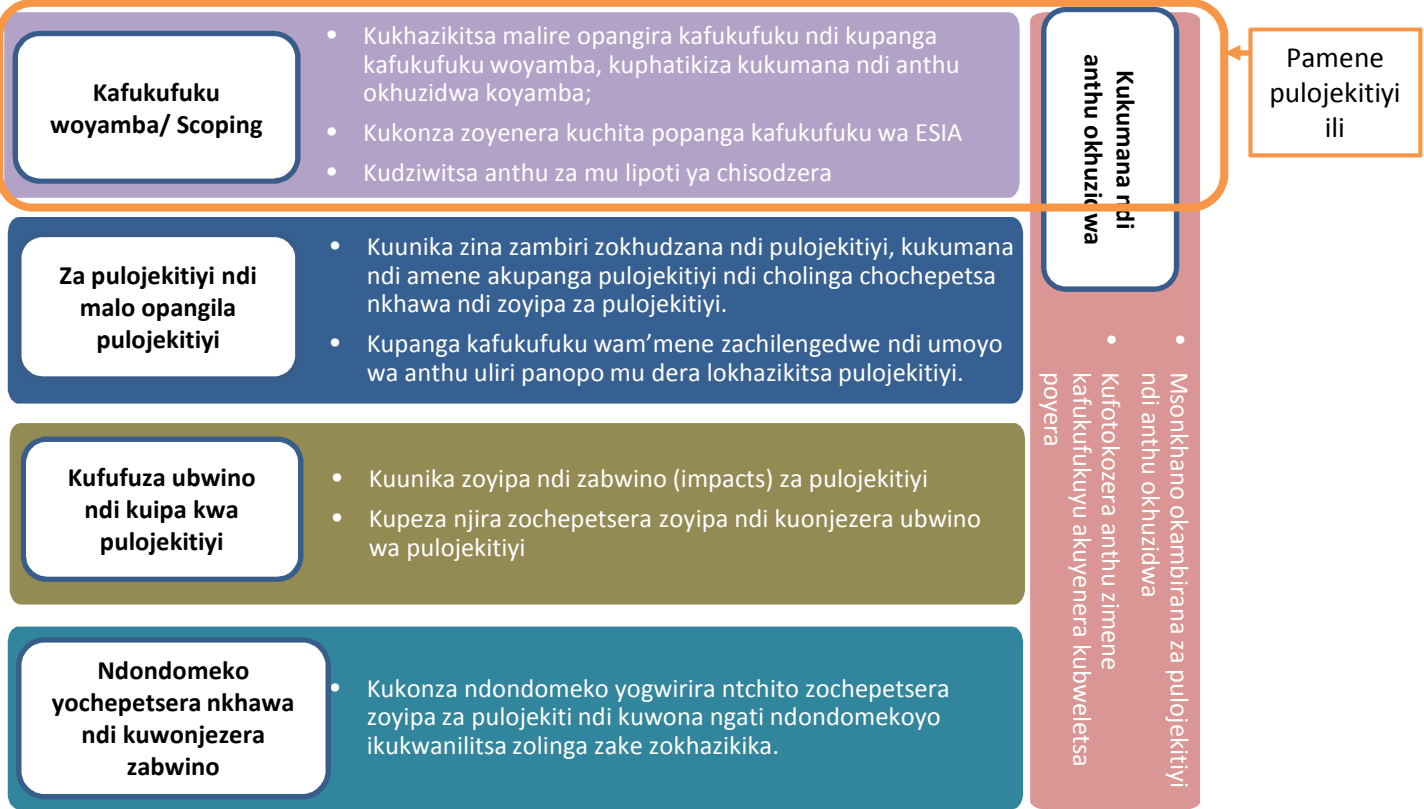
ProjectCo akukonza ma pulani omanga malo opangila magetsi a mphamvu yadzuwa (Solar Photovoltaic) m'boma la Salima, m'chigawo chapakati kuno ku Malawi. Mphavu yamagetsiyi idzalumikizidwa ku nthambo za 132 kilovolt (kV) za ESCOM ku malo a ESCOM ku Salima.



- Mwa zina zimene pulojekitiyi idzakhazikitse:**
- Mapanulo osinthira mphavu yadzuwa kukhala magetsi, mainveta osinthira magetsi kuti afanane ndi a ESCOM, ndi transformer yowonjezera mphavu yamagetsi;
 - Mpanda ozungulira malo okonzera magetsi;
 - Nthambo zapansi za magetsi; ndi
 - Nyumba yoyatsira ndi kupatulira mphavu yamagetsi ndi kusungira katundu
 - Misewu yopita ku malo okonzera mphavu za magetsiwo ndi ya mkati mwampanda; ndi
 - Nthambo zotalika makilomita atatu kapena anayi, zokoka mphavu ya magetsi a 132 kilovolt (kV), zimene zidzamangidwe pambali pa nthambo za magetsi a ESCOM

Misonkhano ndi Anthu Okhuzidwa ndi Pulojekiti

Popitiriza kafukufuku wa pulojekitiyi, kuunikawa mmene pulojekitiyi ingakhuzile zachilengedwe ndi umoyo wa anthu (Environmental and Social Impact Assessment, mwachidule ESIA) akupangidwa. Mwazina kafukufukuyu aunikila nkhawa ndi ubwino omwe pulojekitiyi ingabweletse ku zachilengedwe kapena umoyo wa anthu. Kafukufukuyu adzaperekanso njira zopewera kapena kuchepetsa mabvuto ndikuonjezera zabwino zapulojekitiyi. Mkati mwakafukufuku ameneyu mudzakhala misonkhano yogawana mzeru ndi kudziwitsana zambiri ndi anthu ogwila ntchito m'boma, m'midzi ndi anthu ena okhuzidwa. Padakali pano tili pakafukufuku woyamba kapena kuti scoping pa chingelezi



Misonkhano ndi anthu okhuzidwa ndi pulojekitiyi ndi gawo lofunikila la kuteteza chilengedwe ndi umoyo wa anthu (ESIA). Misonkhano imeneyi ikupereka mwayi woti anthu osiyanasiyana, kuphatikizapo ogwira ntchito kuboma ndi anthu okhuzidwa ndi pulojekitiyi apereke maganizo awo ndi nkhawa zawo pa pulojekitiyi. Komanso misonkhanoyi ipereka mwayi woti anthu athandize kuti mapulani a pulojekitiyi akhale abwino, osadzetsa mabvuto paumoyo wa anthu kapena zachilengedwe.



Kafufuku wa ubwino ndi zoyipa zimene pulojekitiyi ingabweletse

Kukulitsa mphavu zamagetsi m'Malawi



Chitukuko kumalo kumene kupangidwe pulojekitiyi ndi ku madera oyandikira



Mwayi wantchito komanso malonda makamaka nthawi yomanga pulojekitiyi



Kutenga malo a anthu, zimene zingapangitse kuti anthu ena akhale opanda malo olima, komanso omanga



Magalimoto adzachuluka mu nsewu



Kuchepetsa fumbi la munsewu pogwiritsa ntchito madzi nthawi yomanga pulojekitiyi



Kubweletsa bvuto lokhuzana ndi umoyo wa anthu, komanso ngozi; kukwera kwa chiwere ngelo cha anthu kudera la pulojekitiyi



Kuchuluka kwa phokoso ndi zinyalala kuchokera kuzomangamanga



Kuononga chilengedwe ndi umoyo wa anthu



Tikufuna timve kwa inu!

Maganizo anu papulojekitiyi ndi ofunikira kwambiri!

Tipezeni ndi maganizo anu, nkhawa zanu ndi mafunso okhuzana ndi pulojekitiyi:

Name: Precious Chaponda

Telephone number: 0888498862

Email: preciouschaponda@yahoo.com

Website: <http://www.jcmpower.ca/>



JCM

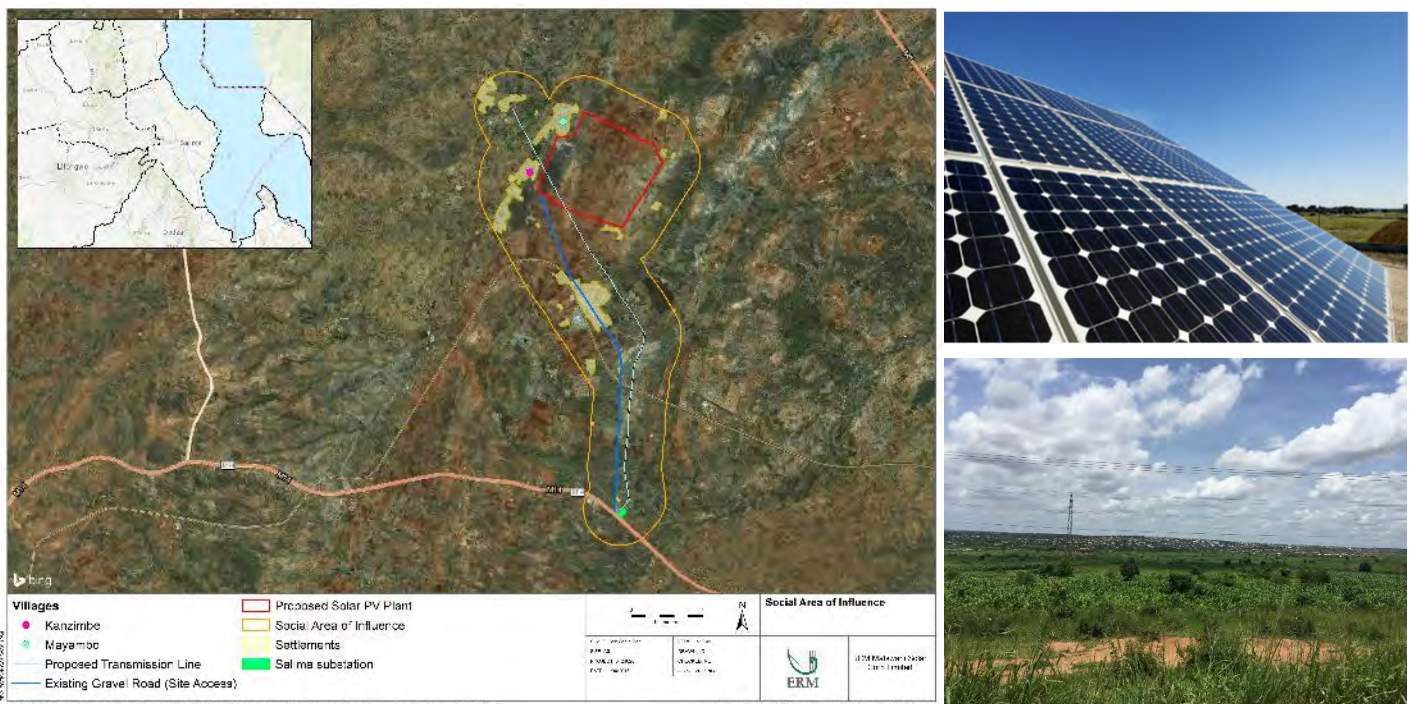


InfraCo
AFRICA

Salima Solar Project: Scoping Disclosure Engagement

Project Overview: JCM Matswani Solar Corp Limited is a limited liability corporation in Malawi owned and managed by a consortium composed of JCM Power, InfraCo Africa Limited and Matswani Capital (PTY) Limited) (herein referred to as 'ProjectCo').

ProjectCo are planning to develop a solar photovoltaic (PV) plant ('the Project') on a land plot in Salima District situated in the Central Region of Malawi. The power from the project will be fed directly into ESCOM's national grid via a short 132 kV transmission line to the Salima substation.

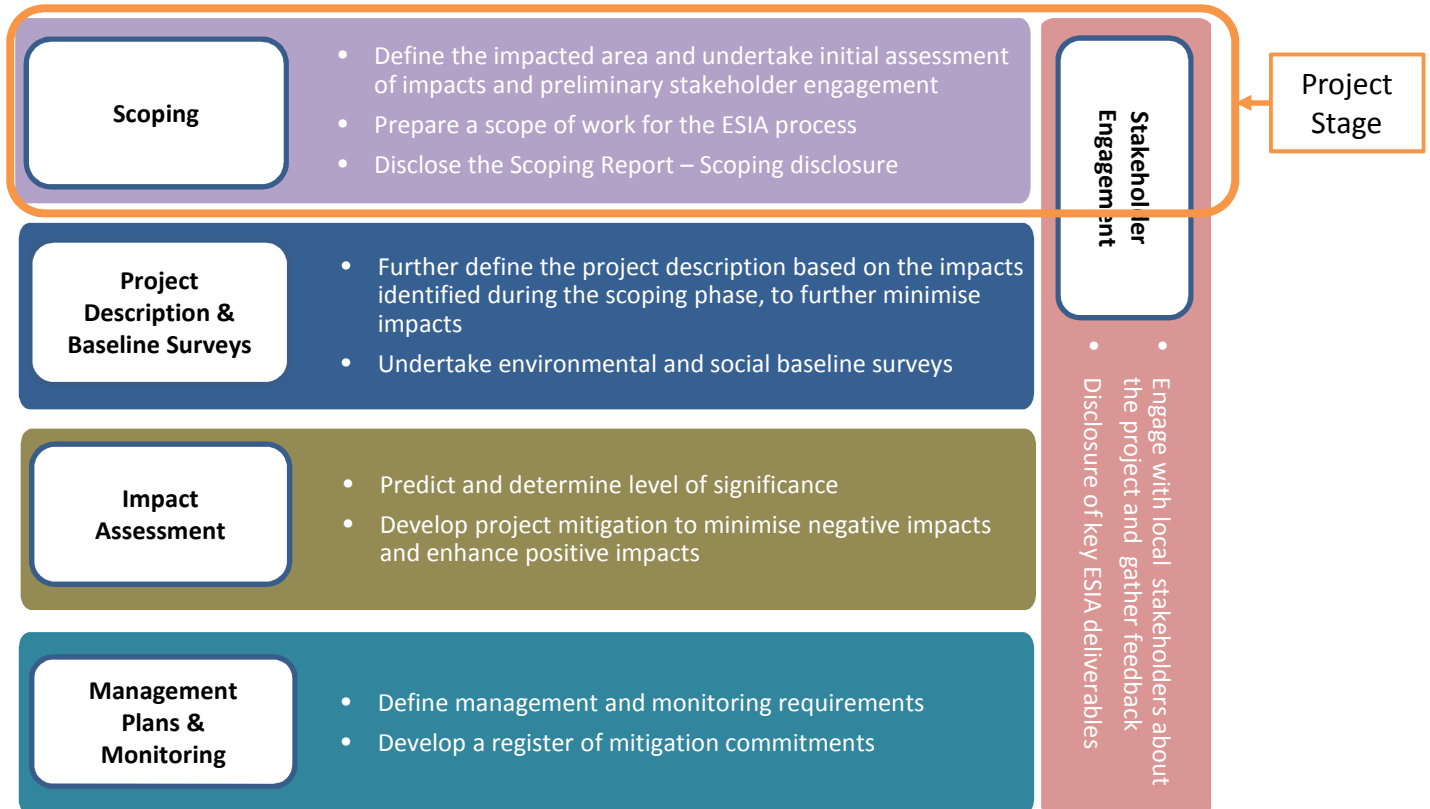


Key Project Components:

- Solar panels / photovoltaic cells, power inverters for grid compatibility, and a transformer for electricity generation;
- Perimeter security fence and security gates/posts;
- Electric cables (underground cables linking the solar panels);
- Stores and control building;
- Internal roads and access roads (including the upgrade of gravel roads); and
- A new 3-4 kilometre 132 kV transmission line, which will be constructed alongside an existing ESCOM transmission line.

ESIA and Stakeholder Engagement

Further to other studies that have been undertaken in relation to the proposed solar project, an Environmental and Social Impact Assessment (ESIA) is being undertaken to assess the potential project impacts on the environment and the community, and to establish measures for avoiding/minimising negative impacts and creating project benefits. This includes gathering information on a variety of topic areas and carrying out meetings with the government, community and other key stakeholders in order to gather feedback on the project to inform the ESIA. The project is currently at the scoping stage, as shown below.



Stakeholder engagement is a key aspect of the ESIA process. It provides an opportunity for various groups, including the government and potentially affected communities to express their views and concerns, as well as participate in the design of the project to minimise negative impacts as much as possible and enhance positive impacts.



ESIA Studies / Potential Impacts

The project will make a positive contribution to Malawi's electricity supply



Benefit sharing through a community investment programmes



Employment, mainly during construction, including local procurement, may create local opportunities and enhance the local economy



Land acquisition, creating land loss, impacting farmers, as well as possibly displacement of a small number of structures



Transportation of equipment during construction will increase traffic in the area



Water use for dust suppression on roads during construction and cleaning of solar panels



Construction will have associated health & safety considerations and may result in potential migration of people into the area



Noise and waste from construction activities



Impacts on local biodiversity and mammals from land clearance during construction



We want to hear from you!

Your views are very important to us!

Please contact us if you have any comments, concerns or questions regarding the project:

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Telephone number: 0888498862

Email: preciouschaponda@yahoo.com

Website: <http://www.jcmpower.ca/>



JCM



InfraCo
AFRICA

Community Presentation: Salima Solar Project – Scoping Disclosure

April 2018

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The business of sustainability



Project Team

Developers



JCM Matswani Solar Corp Limited (ProjectCo) is a Malawian renewable energy company comprised of JCM Power (JCM Power), InfraCo Africa Limited (InfraCo) and Matswani Capital (PTY) Limited (Matswani).



JCM Power is a Canadian-based renewable energy company dedicated to accelerating social, economic and environmental sustainability in growth markets through the development, construction and operation of renewable energy facilities.



InfraCo Africa Limited provide funding and expertise to infrastructure projects at their earliest stage, enabling them to grow from an initial concept to an investment opportunity.

Consultants



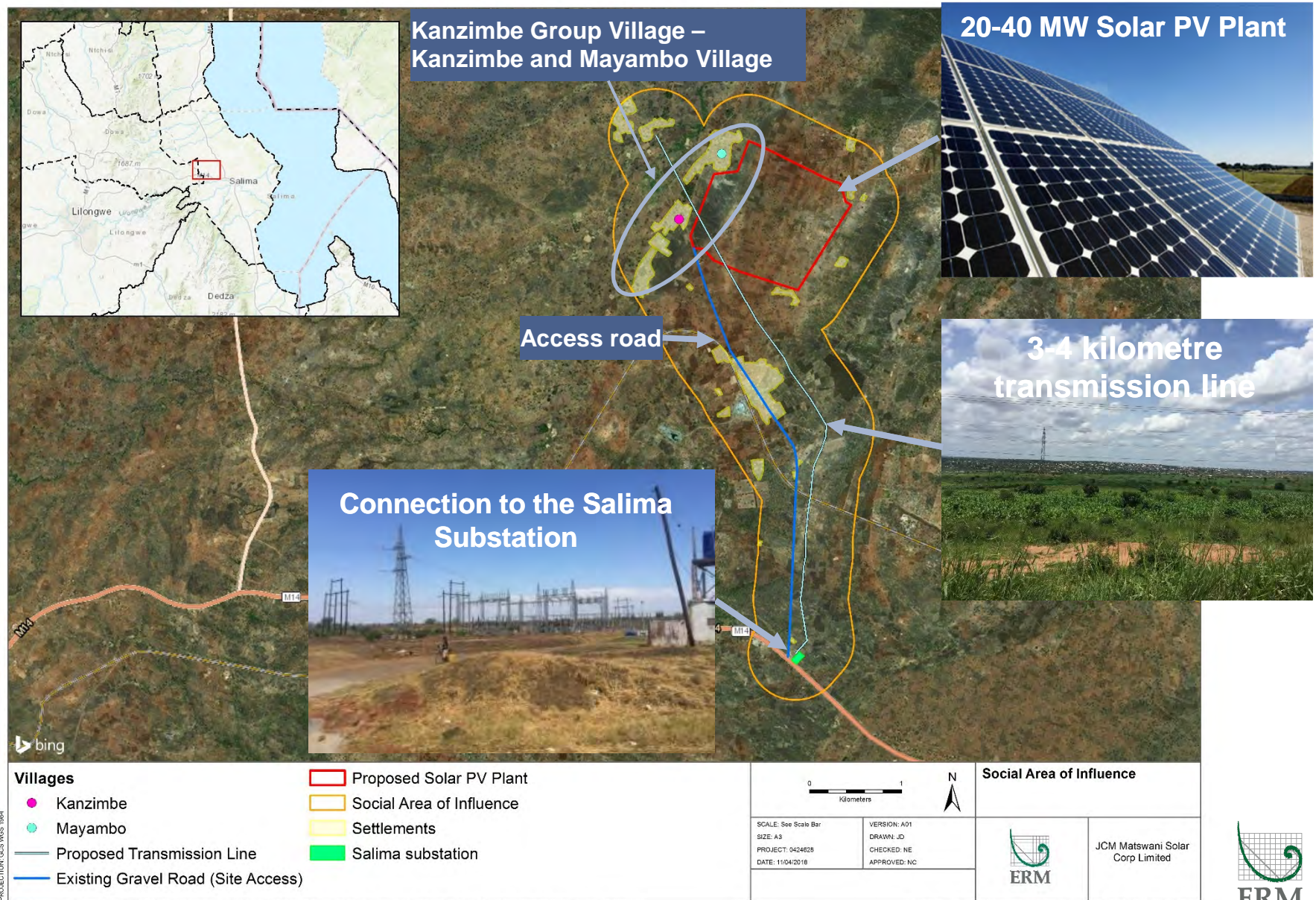
Environmental Resources Management (ERM) is an international sustainability consultancy with over 140 offices globally. ERM is supporting JCM with the Environmental and Social Impact Assessment (ESIA) and Resettlement Action Plan (RAP) / Livelihoods Restoration Plan (LRP)



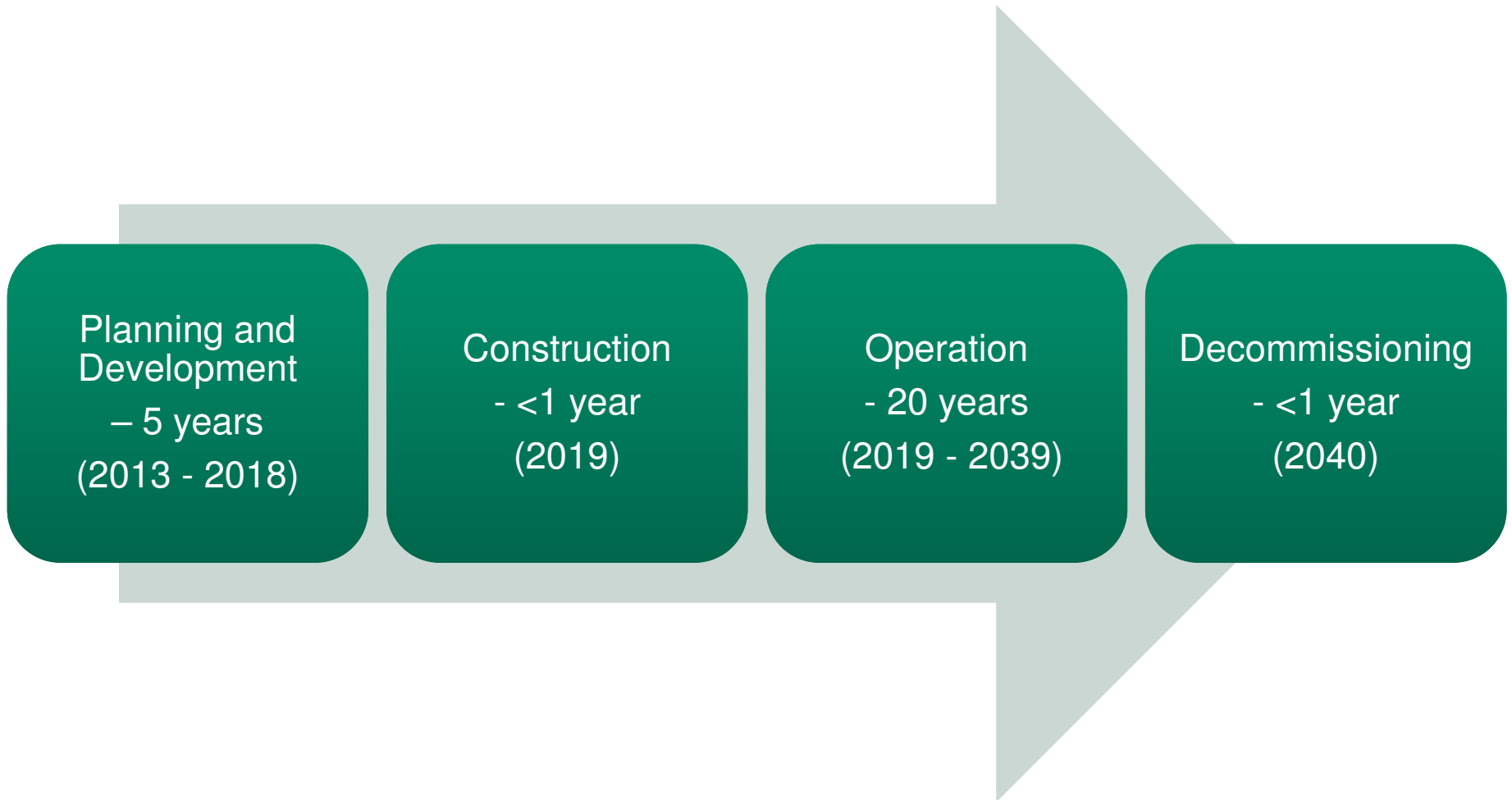
Waste, Water and Environment Consultancy (WVEC) is a Malawian established company base in Lilongwe. They provide environmental and social services to developers.



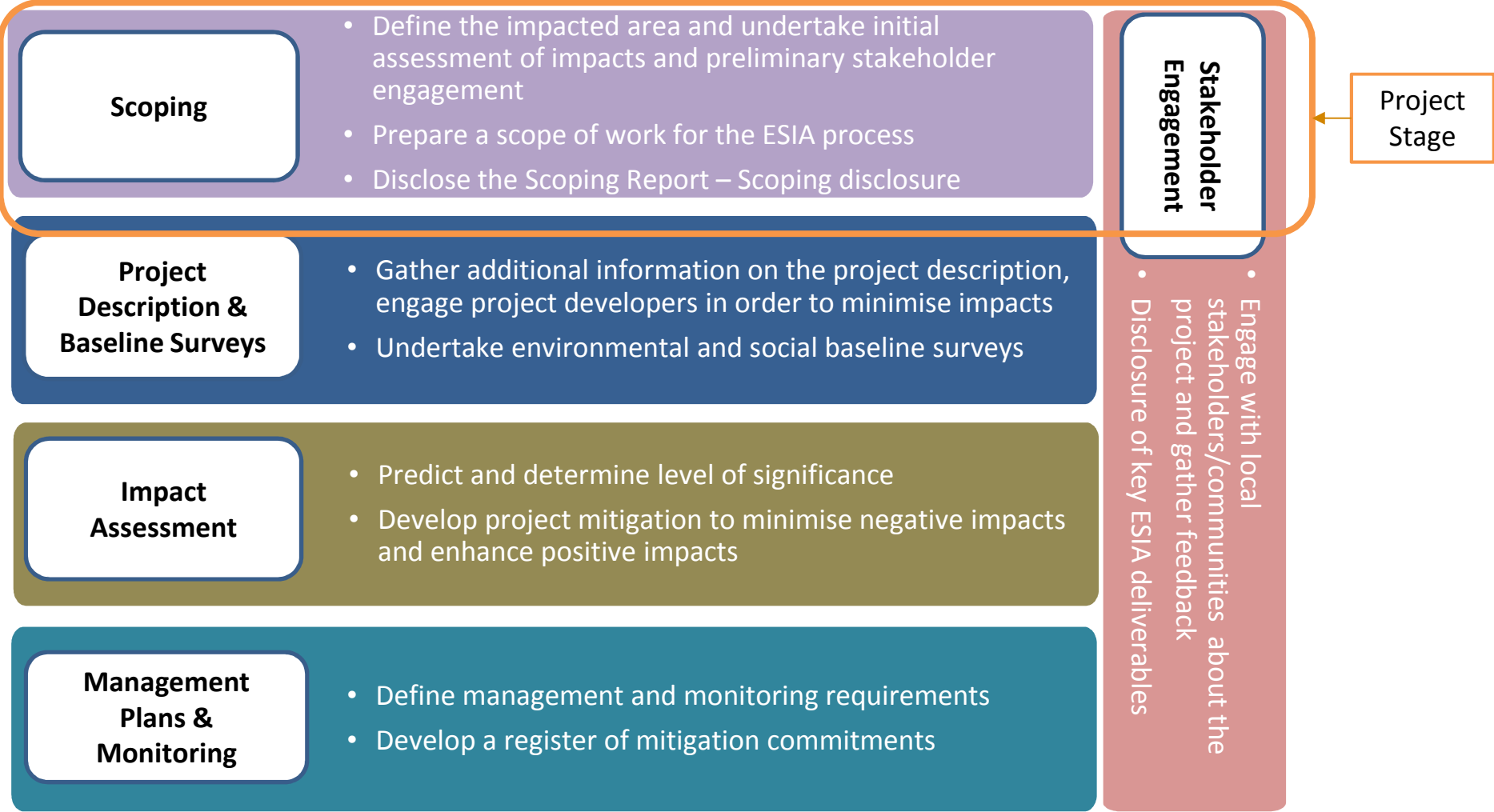
What is the Project?



Provisional Project Schedule



Environmental & Social Impact Assessment



The ESIA will be done in accordance with Malawian legislation and the IFC requirements



Potential Project Benefits

The project will make a positive contribution to Malawi's electricity supply



Benefit sharing through a community investment programmes



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ESIA Studies/ Potential Impacts

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Stakeholder Presentation: Salima Solar Project – Scoping Disclosure

April 2018

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The business of sustainability



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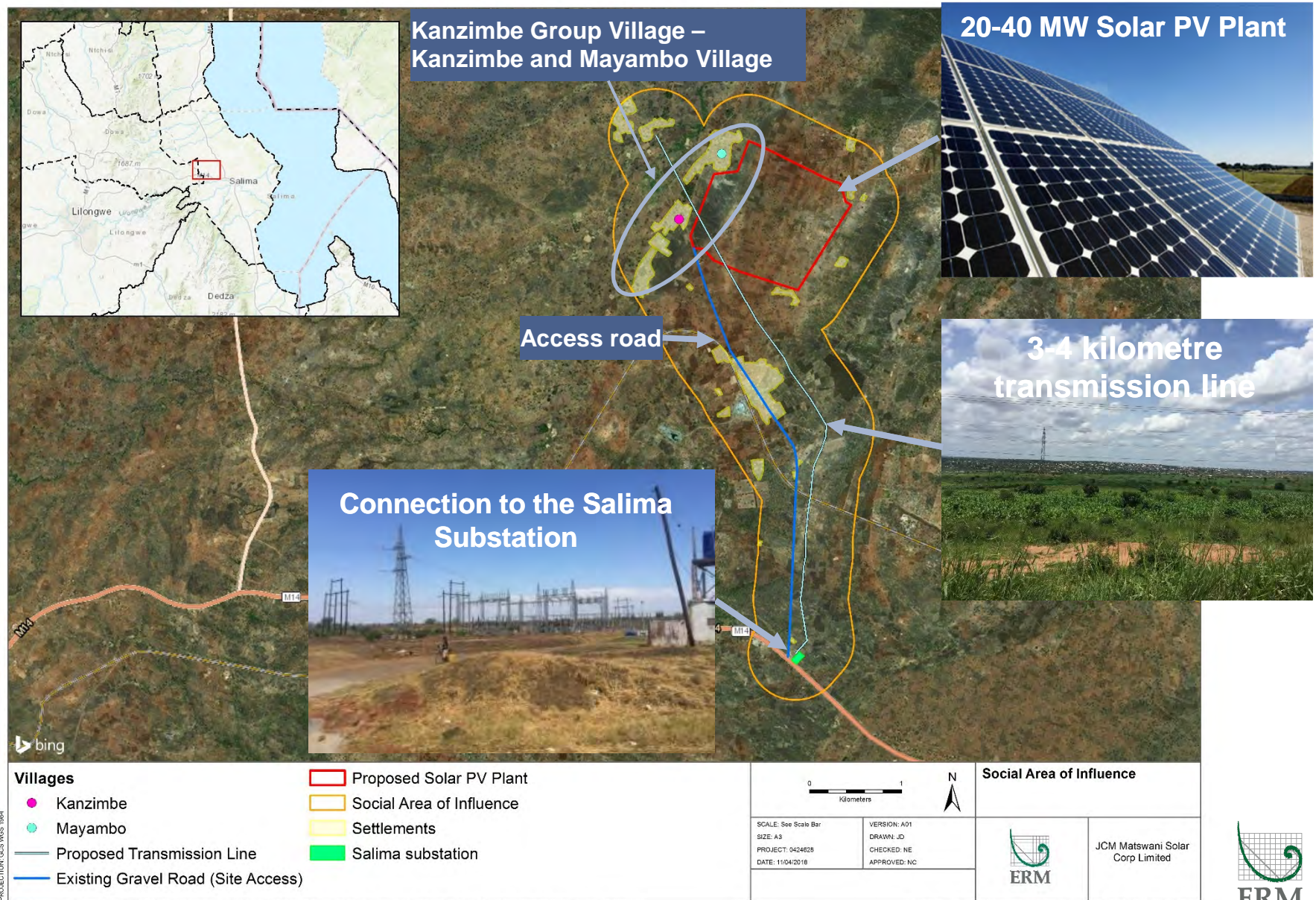
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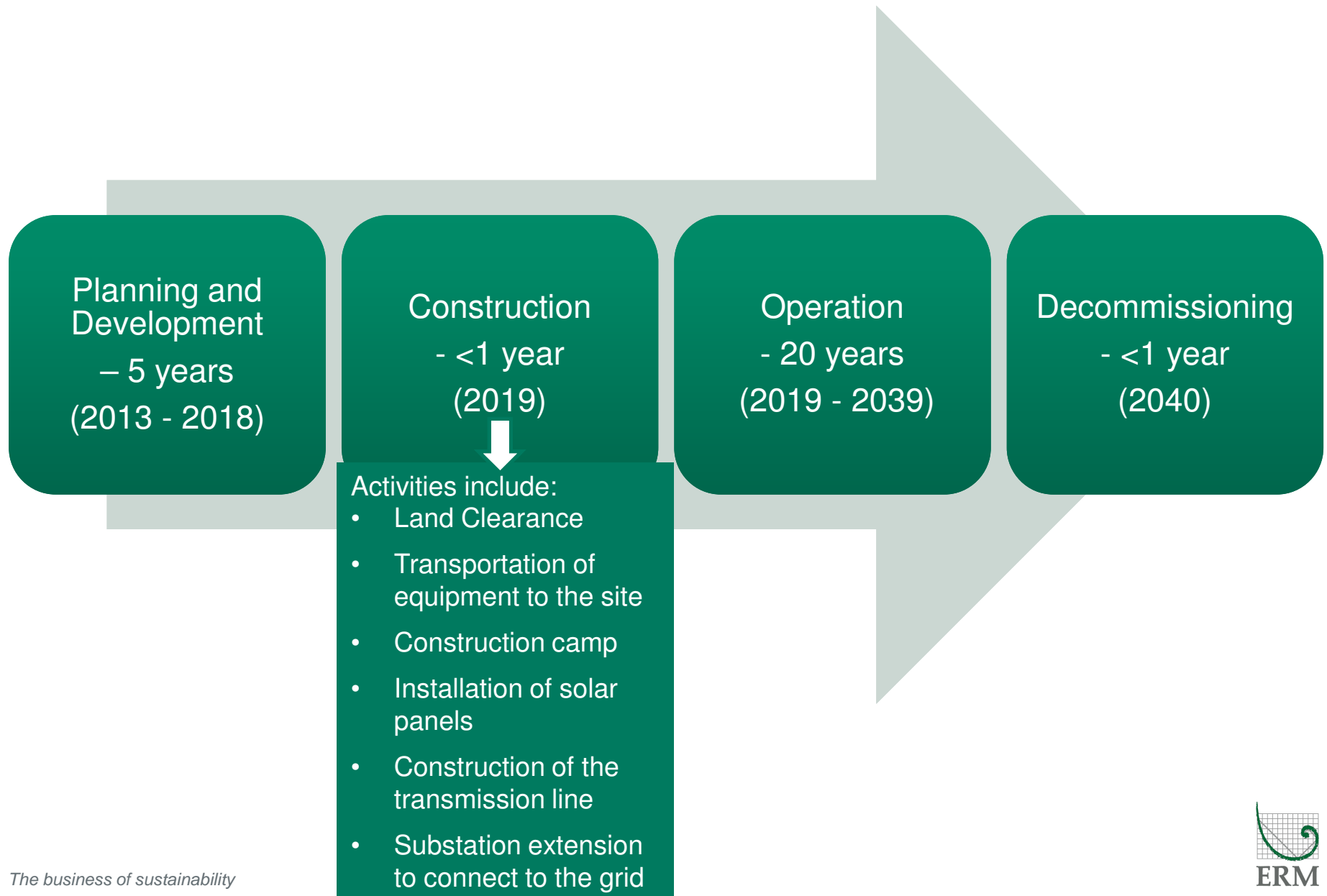
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What is the Project?



Provisional Project Schedule



Key Project Standards



Government of Malawi



Laws and requirements include:

- Guidelines for Environmental and Social Impact Assessment (1997)
- Environmental Management Act (1996)
- National Energy Policy (2013)
- Electricity Act (2004)
- Constitution of Malawi (1995)
- Land Act (2016)
- Land Acquisition Act (1971)

Alignment with the International Finance Corporation (IFC)

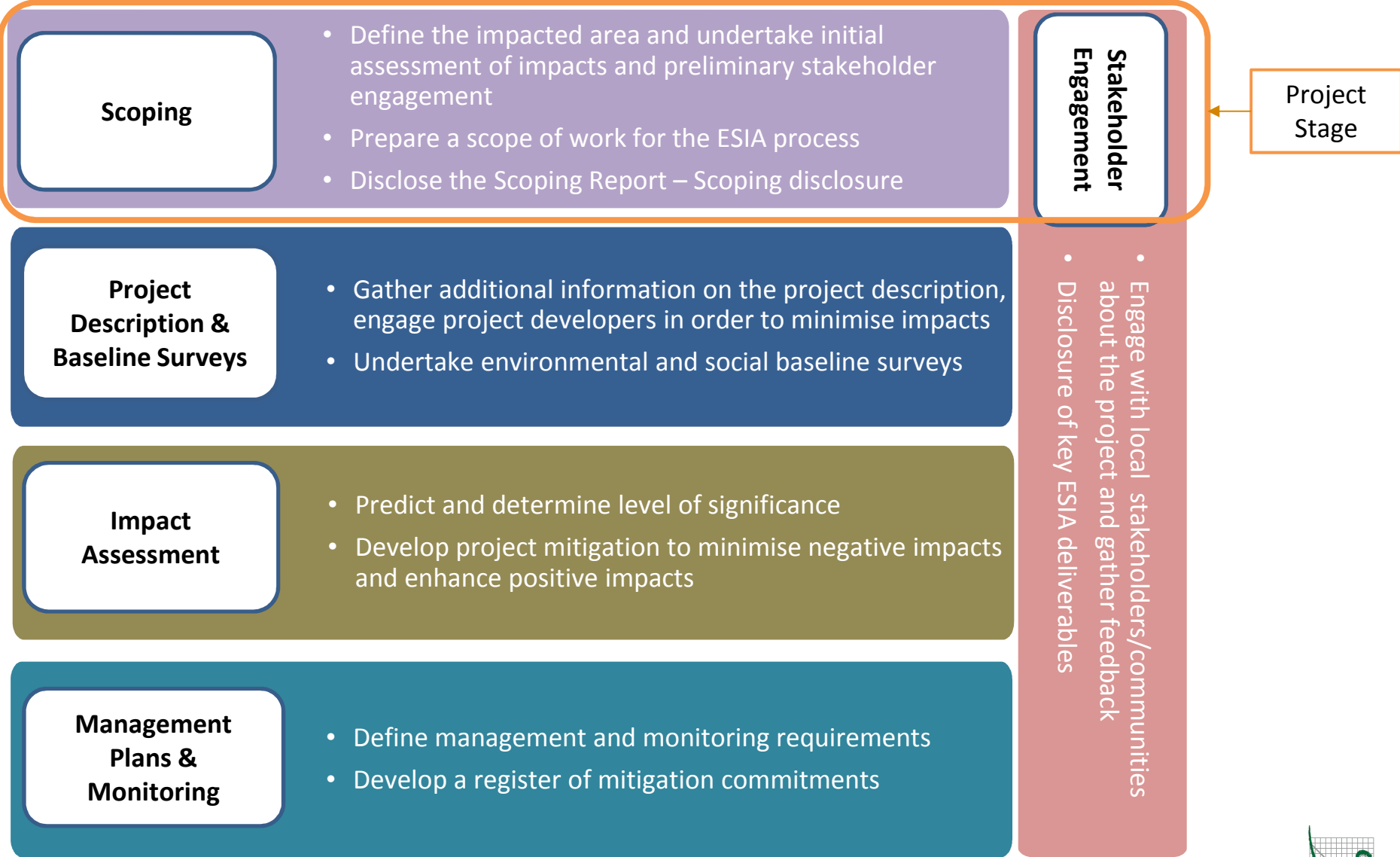
Performance Standards:

- **PS1:** Assessment and Management of Environmental and Social Risks and Impacts.
- **PS2:** Labour and Working Conditions.
- **PS3:** Resource Efficiency and Pollution Prevention.
- **PS4:** Community Health, Safety, and Security.
- **PS5:** Land Acquisition and Involuntary Resettlement.
- **PS6:** Biodiversity Conservation and Sustainable Management of Living Natural Resources.
- **PS7:** Indigenous Peoples (not relevant)
- **PS8:** Cultural Heritage.

IFC Environmental, Health and Safety Guidelines on:

- EHS Guidelines for Electric Power Transmission and Distribution

Environmental & Social Impact Assessment

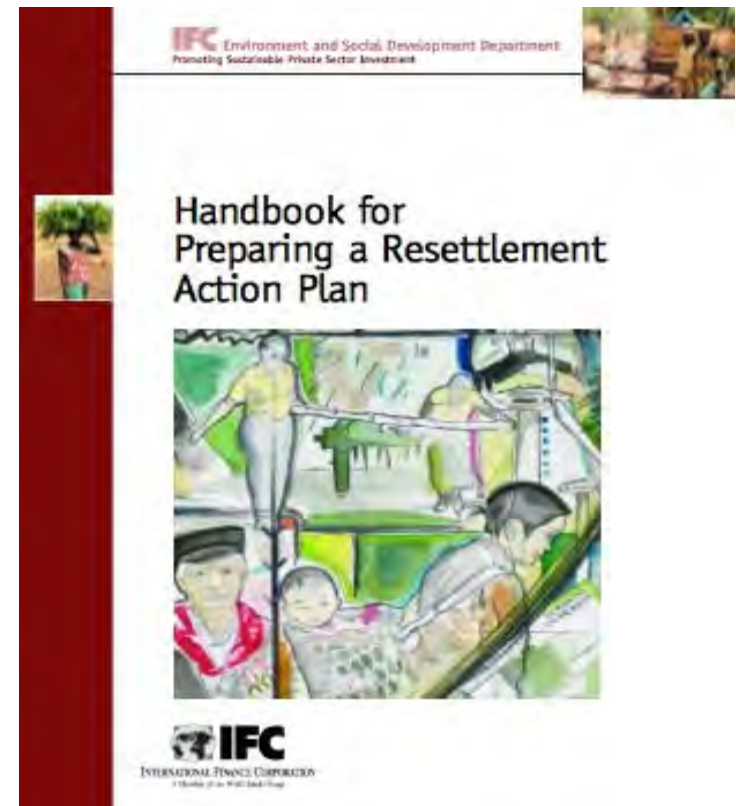


Resettlement Action Plan / Livelihood Restoration Plan

At this stage it is unknown if physical will be required. As such, the social studies will determine the nature of displacement and if a RAP or LRP is required. The RAP/LRP will include detailed household surveys, asset verification and engagement with the affected households, in collaboration with the Salima District Office.

Contents of a RAP/LRP:

- Introduction and scope of the RAP/LRP
- Project description
- Project efforts to minimize displacement/project alternatives
- National and international requirements, including a gap analysis
- Stakeholder engagement approach and RAP/LRP methodology
- Socio-economic baseline, including household and asset surveys
- Physical and / or economic displacement impact assessment
- Eligibility and entitlements matrix
- Resettlement site options
- Livelihood restoration programme options
- Grievance mechanism
- Implementation roles and responsibilities, and institutional arrangements
- Monitoring and evaluation
- Provisional implementation budget and schedule
- Stakeholder Engagement Plan



Potential Project Benefits

The project will make a positive contribution to Malawi's electricity supply



Benefit sharing through a community investment programmes



Employment, mainly during construction, including local procurement, may create local opportunities and enhance the local economy



ESIA Studies/ Potential Impacts

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Appendix B

Example Stakeholder Engagement Management Templates

APPENDIX B: STAKEHOLDER ENGAGEMENT MANAGEMENT TEMPLATES

8.3

MEETING MINUTES TEMPLATE

Meeting Minutes Template		
Section 1. Meeting Details		
Location:		
Settlement:		
Traditional Authority:		
District:		
Region:		
Date:		
Project Representatives:		
No of Females:	No of Males:	
Section 2: Meeting Minutes (note relevant questions, responses)		
Section 3: Facilitator Observations		
Insert key observations (level of participation, response to the meeting, general observations):		
Section 4: Follow-on Actions		
Issue Raised	Who by?	Action

Section 5: Evaluation of Feedback Process			
How many participants took part in the feedback process?			
Insert the number of yes, no, partially responses to each question in the relevant box			
Was the meeting useful?	Yes	No	Partially
Was the information presented in a clear manner and do you feel that you have a good understanding of the project activities and plans?	Yes	No	Partially
Were you able to ask the questions you wanted?	Yes	No	Partially
Was this meeting organised in a way to facilitate your attendance?	Yes	No	Partially

STAKEHOLDER DATABASE/ACTIVITY LOG (EXCEL SPREADSHEET)

Section 1: Meeting Details	Location	Settlement	District (use picklist)	Traditional Authority (use picklist)	Region (use picklist)	Date of Meeting	Project Representatives (Full name and company)	No of Females	No of Males

Section 2: Meeting Mins	Issue Title (Use picklist)	Participant Question/Comment/Quote	Project Response (If no response required or given, leave blank)	Issue Rating (low/medium/high priority)

Section 3: Facilitator Observations	Insert key observations (level of participation, response to the meeting, general observations):

Section 4: Follow-on Actions	Issue Raised	By Who?	Action

Grievance Record			
Grievance Number:	Date Submitted:	Target Date for Resolution:	
Name:			
Address and Contact Details			
Grievance Received By:			
Name of Grievance Officer:			
Description of Grievance:			
Assessment of Grievance Significance Level:		Signature and Role:	
Actions to Resolve Grievance			
Delegation to:			
Action	Who	When	Completed Y/N/Date
Response/Resolution:			
Strategy to Communicate Response:			
Sign-Off:			
Date:			
Conclusion			
Is complainant satisfied?	Y/N	Comments from Grievance Officer:	
Complainant comments regarding resolution:			
Grievance Closed?	Y/N	Grievance Resubmitted?	Y/N
Signature and Role:		Date:	
Date:		New Grievance Number:	

Section 1 - Details						
Grievance record number	Date communicated	Time communicated	Name of complainant if not anonymous	Contact number of the complainant	Address of complainant	Name of staff member that received the complaint

Section 2 - Grievance Raised		Section 3 - Reporting and Acknowledgement			
Grievance subject (eg land acquisition, employment, health)	Description of issue/complaint	Communication channel used (eg face to face, telephone, email etc)	Has the issue been documented in a grievance record form? (Y/N)	Has an acknowledgement been submitted to the complainant with a redress date? (Y/N) if so what date?	Name of staff member that submitted the acknowledgement to the complainant

Section 4- Grievance Management			Section 5 - Corrective Actions/Resolution								
Has the complaint been re-assigned to a different person/department?	Name of staff member managing the complaint	Expected resolution date	Description of resolution	Has the resolution been communicated to the complainant?	Method of communication to the complainant	Date resolution communicated to the complainant	Is the complainant satisfied with the resolution? (Y/N)	If not, what additional action is being taken?	Name of staff member assigned	Revised resolution, if applicable	Grievance status started/pending/

GRIEVANCE FORM

Grievance Record			
Grievance Number:	Date Submitted:	Target Date for Resolution:	
Name:			
Address and Contact Details			
Grievance Received By:			
Name of Grievance Officer:			
Description of Grievance:			
Assessment of Grievance Significance Level:		Signature and Role:	
Actions to Resolve Grievance			
Delegation to:			
Action	Who	When	Completed Y/N/Date
Response/Resolution:			
Strategy to Communicate Response:			
Sign-Off:			
Date:			
Conclusion			
Is complainant satisfied?	Y/N	Comments from Grievance Officer:	
Complainant comments regarding resolution:			
Grievance Closed?	Y/N	Grievance Resubmitted?	Y/N
Signature and Role:		Date:	
Date:		New Grievance Number:	

Phase II land			Phase I Land		
Name of Affected Person	Number of Land plots	Survey number	Name	Number of Land Plots	Survey Number
Efelo Poseponse	2	JCM-02-001	Agelo Mwazombwe	1	JCM01010201020
Alifa Mulitani	2	JCM-02-002	Agness Jackson	2	JCM01010102012D / JCM01010201022
Mary Raphael	3	JCM-02-003	Analiyelo Chichango	1	JCM01010102012E
Florence Samson	1	JCM-02-004	Betine Namagetsi	1	JCM01010102024
Dyson Gawanani	1	JCM-02-005	Botiyasi Sanjeni	1	JCM01010102012F
Luciano Cement	2	JCM-02-006	Chataika Chilima	1	JCM01010101018
Maria Lafuwelo	1	JCM-02-007	Christina Beriyamu	2	JCM01010201011
Rashid Denisoni	2	JCM-02-008	Christina Kadango	1	JCM01010201010
Falisi Zakaliya	1	JCM-02-009	Christina Lenard	2	JCM01010102012K / JCM01010102009
Folias Chikosa	1	JCM-02-010	Dalesi chatsika	1	JCM01010102007
Zione Folias	1	JCM-02-011	Denala Dyson	1	JCM01010101012
Grace Makanya	1	JCM-02-012	Dickson Mdzaonanj- Denala Dyson	1	JCM01010101001
Mary Zefeniya	1	JCM-02-013	Dingase Chatsika	1	JCM01010202006
Zefaniya Kumatso	1	JCM-02-014	Dinosi Jumbe	1	JCM01010201009
Veronica Kuchitipi	1	JCM-02-015	Divilias Dyson	1	JCM01010101013
Patilisha Zefeniya	1	JCM-02-016	Efelo Posepose	1	JCM01010101016
Faina Kawale	1	JCM-02-017	Eleni Kavala	1	JCM01010102012G
Lesina Kalinda	1	JCM-02-018	Enifa Menyako (also known as Pililani Menyako)	3	JCM01010101004 / JCM01010102002 / JCM01010102019
Maria Bilijohn	1	JCM-02-019	Eria January	1	JCM01010201002
Esnart Frank	1	JCM-02-020	Flora Bushiri	2	JCM01010101003 / JCM01010102018
Sapuledi Chimphote	1	JCM-02-021	Florence Jackson	1	JCM01010101014
Lemon Jentala	1	JCM-02-022	Foster Malamulo	1	JCM01010201017
Jimu Maloni	2	JCM-02-023	Getrude Mkandawire	2	JCM01010201012 / JCM01010201001
Promise C. Sofasi	1	JCM-02-024	Hamiton Lemoni	1	JCM01010201004
Mezia Henderson	1	JCM-02-025	Ida Kaputeni	1	JCM01010102014
Miliwadi Chikweni	2	JCM-02-026	Jolamu Luwisi	2	JCM01010101009 / JCM01010102012A
Nelia Miliwadi	1	JCM-02-027	Lebita Chatsika	1	JCM01010101001
Brenda Samson	1	JCM-02-028	Lifinet George	1	JCM01010201018
Ireen Miliwadi	1	JCM-02-029	Liness Matayo	1	JCM01010201014
William Banda	1	JCM-02-030	Loji Fukiza	2	JCM01010102012H / JCM01010102029
Davite Layson	1	JCM-02-031	Loji Kadiwa	1	JCM01010101010
Munapha Chimbala	1	JCM-02-032	Loveless Limbikani	2	JCM01010102021 / JCM01010102017
Dorica L. Divala	1	JCM-02-033	Lubia Chatsika	1	JCM01010102004
Loveness Limbikani	1	JCM-02-034	Macdonald Dyson	1	JCM01010102027
Fainess Edward	1	JCM-02-035	Madoni Anderson (deceased) - Person interviewed was Paulo Anderson (brother to the deceased)	1	JCM01010101011
Numeri Kuwani	1	JCM-02-2036	Malekano Botiyasi	1	JCM01010102012L
Fulola Botiyasi	1	JCM-02-2037	Marita Jackson	1	JCM01010201025
Estere Chataika	1	JCM-02-2038	Matias Mose	1	JCM01010101001
Jonathan Luka	1	JCM-02-2039	Matiya Mtsakamula	1	JCM01010101001
Ganizani J. Nelson	1	JCM-02-2040	Mery Rafuwelu	1	JCM01010101015
Liziness Chataika	1	JCM-02-2041	Mochela Kawale	1	JCM01010102012D
Salome Raphael	1	JCM-02-2042	Mtipi livison	1	JCM01010101007
Botiyasi Malekano	1	JCM-02-2043	Mulipenji Chapana	2	JCM01010201003 / JCM01010201007
Menyako Loge	1	JCM-02-2044	Mulitani Hagayi	1	JCM01010102029
Christina Mitembo	1	JCM-02-2045	Natisha Lemani	1	JCM01010102005
Anifa Botiasi	2	JCM-02-2046	Polina Kondoni	1	JCM01010101002
Richard Tembo	1	JCM-02-2047	Rosina Jenala	1	JCM01010201015
Muthelanji Kachule	1	JCM-02-2048	Saulosi Menyako	1	JCM01010102020
Indlosi Tikiton	1	JCM-02-2049	Sayina Anderson	1	JCM01010102010
Emilida Jasi	1	JCM-02-2050	Sewero Anderson	1	JCM01010102013
Kutsala Chienda	1	JCM-02-2051	Shupi Kawale	1	JCM01010102012C
Deliya Chataika	1	JCM-02-2052	Sofiya Katiyi	1	JCM01010201016
Nelson Hendrina	1	JCM-02-2053	Spelani Jabesi	1	JCM01010201010
Rebson Chiyenda	1	JCM-02-2054	Stephano Samalani	1	JCM01010102016
Folias Bowa	1	JCM-02-2055	Thomas Kadango	1	JCM01010201019
Watson Gondwe	1	JCM-02-2056	Watisoni Gondwe (Gorgina Watison)	2	JCM01010101008 / JCM01010102025

Charles Kaziputa	1	JCM-02-2057	Wilson Kadiwa	2	JCM01010101005
Malia Eliya	1	JCM-02-2058	Wisiki Tiopa	1	JCM01010201023
Ledison Lemison	1	JCM-02-2059	Yakobe Makisoni	1	JCM01010102026
Macmillan Livison	1	JCM-02-2060	Yosefe Lemosi	1	JCM01010201006
Istoni Kinford	1	JCM-02-2061	Agnes Rabson	1	JCM01010102012M
Ketilina Mwazona	1	JCM-02-2062	Anamtchathu	1	JCM01010102012J
Grace Jasi	1	JCM-02-2063	Chrissy Singo	1	JCM01010102022
Runesi Luka	1	JCM-02-2064	Eliya Sayimoni	1	JCM01010102023
Zaina Katchokani	1	JCM-02-2065	Ester Type	1	JCM01010201008
Elemya Katchokani	1	JCM-02-2066	Henry Limbikani	1	JCM01010102012B
Grace Katchokani	1	JCM-02-2067	Mercy Dickson	1	JCM01010201021
Haward Chidambaila	1	JCM-02-2068	Nani Kambewa	1	JCM01010201005
Tiamike Tobias	1	JCM-02-2069	Phinias Gondoloni	1	JCM01010102003
Levison Chidambaila	1	JCM-02-2070	Sapuredi Chidambayila	1	JCM01010101006
Phele Sinelifa	1	JCM-02-2071	Sekelani Godfrey	1	JCM01010102002
Steven Type	1	JCM-02-2072	Unice Fundi	1	JCM01010102028
Elena Honda	1	JCM-02-2073			
Tiopa Anangose	1	JCM-02-2074			
Georinah Lumwila	1	JCM-02-2075			
Agnes Jackson	1	JCM-02-2076			
Symon Eliya	1	JCM-02-2077			
Malita Jackson	2	JCM-02-2078			
Wiski Timothy Chisamba	1	JCM-02-2079			
Lyforn Timoni	1	JCM-02-2080			
Stella Gevinala	1	JCM-02-2081			
Chakuliya Chikalema	2	JCM-02-2082			
Milika Kachepa	1	JCM-02-2083			
Mavuto Kenesi	1	JCM-02-2084			
Griceria Msesa	1	JCM-02-2085			
Emily Zenasi	1	JCM-02-2086			
Chrissy Kalulu	1	JCM-02-2087			
Josilin M. Stera	1	JCM-02-2088			
Enifa zekeria	1	JCM-02-2089			
Jonathan Dimaja	1	JCM-02-2090			
Yelemiya B. Shema	1	JCM-02-2091			
Grace Nepiyala	1	JCM-02-2092			
Mausiyeko Salima	1	JCM-02-2093			
William Kenesi	1	JCM-02-2094			
Falesi Kenesi	1	JCM-02-2095			
Shema Batson	1	JCM-02-2096			
Dinosi Jumbe	1	JCM-02-2097			
Tsogolani Jumbe	1	JCM-02-2098			
Muzineyi Timoni	1	JCM-02-2099			
Thokozani Tiopa	2	JCM-02-2100			
Getrude Mkandawire	1	JCM-02-2101			
Rozalia Mologeni	1	JCM-02-2102			
Dyson Yosefe	1	JCM-02-2103			
Maxwell Showa	1	JCM-02-2104			
Lioni Nguluwe	1	JCM-02-2105			
Vaillet Charles	1	JCM-02-2106			
Ganizani Matias	1	JCM-02-2107			
Tereza Medson	1	JCM-02-2108			
Yancinto Chikapa	1	JCM-02-2109			
Kalipoti Chimavi	1	JCM-02-2110			
Jelad thomas	1	JCM-02-2111			
Khristina Chisi	1	JCM-02-2112			
Yosefe Lemoni	1	JCM-02-2113			
Lameki Masautso	1	JCM-02-2114			
Dorothy Jailos	1	JCM-02-2115			
Tomasi Kadango	1	JCM-02-2116			
Dickson Josen	1	JCM-02-2117			
Agelo Mazombe	1	JCM-02-2118			
Rabecca Matiki	1	JCM-02-2119			
Lefineti George	1	JCM-02-2120			
Christina Beliyamu	1	JCM-02-2121			
Liness Matayo	1	JCM-02-2122			
Godfrey Velias	1	JCM-02-2123			

Annex E

EAD ESIA Terms of Reference

11. Undertake stakeholder consultation to ensure key interested and affected stakeholders are involved in the Environmental Impact Assessment process. Incorporate their views in the report and indicate a record of consultations in the appendices parts of the report.
12. The preparation, presentation and structure of the EIA report should follow the format in the Guidelines of Environmental Impact Assessment for Malawi (1997) as stipulated on pages 33-37. The minimum content of required information in an EIA Report is outlined on pages 53-59.
13. In order to adequately address the core issues of the study, it is advisable that the team should at least be composed of:
 - EIA Expert
 - Social Expert
 - Engineering Expert
14. Submit 10 hard copies and a soft copy of the EIA report to the Director of Environmental Affairs.
15. Provide the names of the EIA Team and their respective fields.

project' alternative. The EIA should also consider 'within - project' alternatives e.g. designs, technology etc.

6. Predict environmental impacts associated with the activities at and around the site, focusing on both the positive and negative impacts. The impacts should include:
 - Project location (e.g. loss of vegetation, loss of agricultural land, loss of grazing pastures, impact on flora and fauna, impact on cultural site (presence of the graveyards), impact on water resources and resettlement of people if any);
 - Project design (e.g. drainage problem and other structures);
 - Construction works (e.g. soil erosion, disposal of construction spoils); and
 - Project operation (e.g. water pollution, impacts on soil, solid waste management and increase in sexually transmitted diseases) phases of the project through its projected life.
7. Prescribe the measures to eliminate, reduce or mitigate the negative effects identified and the measures to enhance the positive effects.
8. Propose an Environmental Management Plan by which all of the measures prescribed in 7 above, will be carried out. Indicate the budget for the recommended mitigation measures, specifications of who will be responsible for these measures and the schedule when these measures will take place during construction and operation of the project.
9. Propose an Environmental Monitoring Plan by which all mitigation measures recommended in Environmental Management Plan will be monitored. The plan should include the activities, frequency of monitoring, the key monitoring indicators, resources required and the authorities responsible for monitoring the exercises.
10. Review the legal framework pertaining to the proposed project and indicate their impacts on the project. Reference should at least be made to the Environment Management Act, Forestry Act, Local Government Act, Water Resources Act, National Water Policy, National Environment Policy, Malawi National Land Policy, Public Health Act, Sanitation Policy, Occupational Safety, Health and Welfare Act, Malawi Development and Growth Strategy other relevant policies and piece of legislation. Furthermore provide an account of all regulatory licenses and approvals obtained for the proposed project to ensure that they are in line with sound environmental management practices and are in compliance with relevant existing legislation.

TERMS OF REFERENCE FOR ENVIRONMENTAL IMPACT ASSESSMENT FOR JCM MATSWANI SOLAR CORP LIMITED PROJECT, SALIMA

1. Provide a full description of the nature/components of the proposed Solar Corp project with respect to the name of the proponent, postal address, aim and objectives of the project, the spatial location of the site for the project, the estimated cost of the project, the size of land for the project site, the number of people to work on the area (provide a breakdown of males and females, locals and non-locals), number of people to be residing on the project area.
2. Provide a site-specific visible topographic map of the area (Scale 1:50,000) showing the proposed sites and (1:10,000) showing existing establishments in the proposed area and surrounding areas. A site plan for the project should be provided. All topographic maps should be in color to portray the themes clearly.
3. Describe main activities to be undertaken in implementation of the proposed project at the site covering pre-construction, construction and operation phase. In the description include the type of machinery to be used, nature and quantity of wastes that will be generated, facilities for appropriate waste disposal and management of waste and estimated costs for the activities.
4. Provide a concise description of the existing biophysical characteristics and the socio-economic environment status of the proposed area by identifying and analyzing:
 - Physical conditions: soil, geology, site topography, temperature, rainfall patterns and drainage system (water courses);
 - Biological resources: scope of vegetative resources of the project area including riparian vegetation, extent of terrestrial and aquatic fauna;
 - Socio-economic conditions: demographic trend within and around the project area, main land uses, agriculture and marketing, business activities, basic infrastructure and health situation including description of HIV/AIDS prevalence rates; and
 - Any changes anticipated during implementation of the project area.
5. State the reason for selecting the proposed site of the project as opposed to other sites. Consider alternatives to the project, such as alternative sites and the reason for selecting the preferred option including the 'no

Telephone: 01 771 111
Telefax No.: 01 773 379
Our Reference No.: EAD 99/07/05
Your Reference No.....

Communications should be addressed to:
The Director of Environmental Affairs



ENVIRONMENTAL AFFAIRS DEPARTMENT
LINGADZI HOUSE
CITY CENTRE
PRIVATE BAG 394
LILONGWE 3
MALAWI

6th January, 2016

The Project Manager
JCM Matswani Solar Corp Limited
Plot 3/306
Sharp Avenue
Lilongwe

Dear Sir,

Review of Project Brief for JCM Matswani Solar Corp Limited Project, Salima

Following the submission of your project brief for the above captioned project, I wish to inform you that the project brief was reviewed.

Following the review, based on the nature and scope of your proposed project, I wish to advise that you are required to conduct a detailed Environmental and Social Impact Assessment (ESIA). Attached are Terms of Reference (TORs) for the same.

Should you have any question on the foregoing, please do not hesitate to contact us.

Yours faithfully,



Mrs. Juwo Sibale

For: DIRECTOR OF ENVIRONMENTAL AFFAIRS

Attd:

Annex F

Ministry of Lands
Compensation Reports

Phase I Report

Tel: 752 911
Please address all communications to:
Regional Commissioner for Lands



MALAWI GOVERNMENT

In reply please quote

**REGIONAL COMMISSIONER
FOR LANDS**

P.O. Box 31298

Capital City

Lilongwe 3

Malawi

COMPENSATION ASSESSMENT OF LAND, BUILDINGS, FRUIT, INDIGENOUS AND
EXOTIC TREES AT A PROPOSED SITE FOR CONSTRUCTION OF A SOLAR POWER
GENERATION STATION AT GROUP VILLAGE HEADMAN KAZIMBE NEAR CHINJOKA
SUB-STATION TRADITIONAL AUTHORITY KARONGA IN SALIMA DISTRICT.



Prepared by:
The Regional Commissioner for Lands ©
Post Office Box 31298
Lilongwe 3
16th August, 2017.

Prepared for
JCM
Post Office Box 378
Lilongwe

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Tel: 752 911
Please address all
communications to:
**Regional Commissioner
for Lands**



MALAWI GOVERNMENT

In reply please quote

**REGIONAL
COMMISSIONER
FOR LANDS**
P.O. Box 31298
Capital City
Lilongwe 3
Malawi

16th August, 2017

The District Commissioner
Salima District Council
Private Bag 1
Salima

JCM
Post Office Box 378
Lilongwe

The Commissioner for Lands
Private Bag 311
Lilongwe 3

Dear Sir,

COMPENSATION ASSESSMENT OF LAND, BUILDINGS, FRUIT, INDIGENOUS AND
EXOTIC TREES AT A PROPOSED SITE FOR CONSTRUCTION OF A SOLAR POWER
GENERATION STATION AT GROUP VILLAGE HEADMAN KAZIMBE NEAR
CHINJOKA SUB-STATION TRADITIONAL AUTHORITY KARONGA IN SALIMA
DISTRICT.

1. INSTRUCTION

In accordance with your request and instruction given to us to assess compensation values payable to beneficiaries affected by the proposed construction of solar generation station at Kazimbe village

Traditional authority Karonga in Salima District. I write to confirm that we have had an opportunity of verifying, analyzing and assessing assets in the project affected area and we had also made enquiries and obtained such further information that we deemed necessary to derive the opinion as to the current values of buildings, land and trees for compensation purposes.

We now certify that having considered all relevant factors regarding the current market values of land, exotic, indigenous and fruit trees in these areas and based on our knowledge of the market we are of the opinion that the total preliminary compensation values for land, buildings, exotic, indigenous and fruit trees as at 16th August, 2017 is in the sum of **K 156,447,891.25 (One Hundred Fifty-Six Million Four Hundred Forty-Seven Thousand Eight Hundred Ninety-One Kwacha Twenty –Five Tambala)**, as per **attached compensation payment forms which indicate names of beneficiaries, affected properties and their compensation values.**

1.1 Purpose of Valuation

This valuation is for compensation of buildings, land and trees on a proposed site for the construction and installation of solar power generation panels at Kazimbe Village Traditional Authority Karonga in Salima District.

1.2 Property Tenure Status

According to records which are kept at Lilongwe Land Registry at Tikwere House floor No. Six indicates that the land in question is customary in nature.

1.3 Land/Plot Extent

According to the preliminary survey carried out by members of staff from The Regional Surveyor General Centre and of the consultant the area to be appropriated extends to approximately **80.66** hectares.

1.4 Property Ownership

The subject property is owned by different individual from surrounding villages and it is being used for cultivation of crops and animal grazing fields.

1.5 Basis of Valuation

The basis used for this valuation is market value, which is defined as “The estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion” (RICS Valuation Standards-Global & UK, 2011).

1.6 Special Assumptions

As the project affected people will not be given alternative land for loss of land as the case is with most customary arrangement, compensation assessment has considered the provision of the Malawi National Land policy of 2002 (4:16) and World Bank's Safeguard Policy OP 4:12. Based on these provisions, this customary land has been valued on replacement cost.

1.7 Extent of Investigations

Information obtained around Salima District Council has been relied upon to a great extent especially on forest and fruit trees. In some cases some information was obtained from Chitedze Research Station in Lilongwe and some from the markets on the assessment of fruit trees and indigenous trees. Property market research was conducted in the District especially along the stretch of the land. The research was done by enquiring cost of building of material around the area through random sampling method. Further enquiries were made on cost land for different purposes i.e. agricultural land; . the attached appendix (appendix A) shows the results of the market research i.e. cost of building materials for various type of properties and the

forest act (act. 63:03) forestry (amendment) rules 2010 . These forestry rules indicates cost various kinds of trees both exotic and indigenous. The survey which was conducted identified ownership of land parcels and subsequently buildings and trees. The areas of land parcels established by the surveyors have been used to arrive at compensation payable for land taken. For the purpose of this report, we have accepted and relied upon the information with which we have been supplied on the assumption that it is both accurate and complete.

1.7 Statement of Approach

There are several principles that have governed this assessment for compensation of the properties along this stretch:

Section 29(1&2) of the Constitution of Malawi says “every person shall be able to acquire property.” and that having acquired that property “no person shall be arbitrarily deprived of such property Section 28 of the Land act (Cap 57:01) provides that any person who suffers any disturbance of, or loss or damage to any interest which he had shall be compensated for such disturbance, loss or damage as is reasonable.

The land Acquisition Act (Cap. 58:04) Section 9 & 10, this Act Provides for the procedures to be followed to assess fair compensation. However, the stipulations in this Act can be superseded by what can be agreed between the parties See Section 10(1).

Chap.4:16 of the Malawi Land Policy (2000) provides for payment of compensation for Customary Land based on open market value (In the meantime, Malawian Laws do not provide for assessment for injurious affection and severance though these heads of claims have been proposed by Special Law commission).

The World Bank's Safeguard Policy OP 4:12 applies to all project-affected people regardless of the number of people affected, the severity of impact and the legality of land holding. It calls for particular attention to the needs of the vulnerable groups especially those below poverty line, the landless, the elderly, women and children, indigenous groups, ethnic minorities and other disadvantaged persons.

2.0 LAND PARTICULARS

The description of the land falls within Traditional authority Karonga in Salima District.

2.1 The Terrain of the area

The land to be expropriated is generally flat land. The land is currently used for agricultural purposes and is currently under customary Law. Some of the crops which are being cultivated in the area include maize, groundnuts, beans, soya and tobacco among others. Almost around every home stead, there are trees, such as natural and planted, fruit trees and shrubs almost around the area. It is not uncommon to find these trees in the gardens. Fruit trees such as mangoes are for commercial purposes. The people in this area also rear livestock like cattle, goat and pigs.

2.2 Locality and the Surrounding Areas

Expectedly, the area being rural in nature is served by gravel roads. The main road is that of Lilongwe-Salima M1 road. This road connects Lilongwe – Salima-Nkhota-Kota and Blantyre. Improvements on the land to be appropriated consist of dwelling houses some built with common burnt bricks covered with corrugated iron sheets, sundried brick built. The survey also revealed that most of the homestead has other out buildings such kitchens and other structures. The area has a thriving commercial centre-Kazimbe which provides the area with groceries and some daily necessities.

2.3 Soil Texture

Though a scientific research has not been carried out but information gathered from the locals indicate that the soil is very fertile therefore making it ideal for agricultural activities and produce good yield of crops such as maize.

3.0 PURPOSE OF THE PROPOSED ACQUISITION

The land is being required for the construction of proposed solar power generation station. The primary usage of this station to increase the electricity power supply capacity to the main Escom grid.

4.0 BASIS OF COMPENSATION

Based on the provisions of The Malawi National Land policy (2002) Chap. 4:16 The World Bank's Safeguard Policy OP 4.12 and Land Act Cap. 57:01, Section 28; Land Acquisition Act (CAP. 58:04 the project – affected people will be compensated for:

- (i) land taken regardless of the "legality of landholding"
- (ii) Loss of livelihood by compensating for fruit, exotic and indigenous trees that maybe destroyed.
- (iii) Loss of buildings
- (iv) Loss of business

4.1 Market Value assessment

In assessing the market value of the land and buildings to be taken, the valuer considered that the value of land and buildings to be taken is the amount which the land and buildings could acquire if sold in an open market by a willing seller might be expected to realize, according to the rules of land and buildings compensation. Further to that, that no allowance was made on account of land and buildings being acquired compulsorily. Neither was the special suitability or adaptability of the land for any purpose

taken into account if that purpose could be a purpose to which it could be applied only in pursuance of the statutory powers.

4.2 Disturbance

The fundamental principle in compulsory acquisition compensation is the amount so far as money can do so, to put the owner in the same position as if his property has not been acquired. Therefore, compensating the owner at the market value for the property taken from him goes only part of the way to attain this end. So, in addition, monetary compensation has to be payable to reimburse the claimant for 'disturbance' or any other matter not directly based on the value of the property.

Disturbance compensation is a sum added to the purchase price of the property compulsorily acquired. It is not payable in respect of the property retained by the claimant. First there is an acquisition price and, if there is such a price disturbance compensation can be included in it. From elsewhere, the Milledge principle based on *Commonwealth v Milledge* (1953), better explains the notion of disturbance. In part it says:

"Disturbance, is relevant only to the assessment of the difference between, on the one hand, the value of the property to a hypothetical purchaser the kind of use to which the owner was putting it at date of resumption, and on the other hand, the value of the property to the actual owner himself for the precise use to which he was putting it at that date."

It is therefore, noteworthy that compensation for the affected properties taken plus disturbance will not always fulfill the requirements of the principle expressed above. There is an idea of severance and injurious affection which has not been included in this assessment as the current law does not stipulate its use.

The disturbance allowance to be added to the project Affected people related to:

- Cost related to identification of replacement land
- Cost of transportation of salvaged items
- Loss of business(This will include revenue lost during transitional period from the time of demolition to relocation)

Considering the above information it is envisaged that the disturbance claims are reasonably foreseeable and a natural consequence of the acquisition. Having considered the above information, 30% has been added to values as disturbance compensation relating to transportation of salvaged materials, identification of alternative land and loss of business.

5.0 VALUATION APPROACH

5.1 Methodology

The methodology applied to determine the value of land is comparison method and for trees and improvements on the land the method applied is **Contractor's Method** and or replacement cost.

5.2 Direct Comparison Method

This method compares the subject property with the prices obtained for other similar properties almost at the same point in time. As for the value of land the valuer has applied comparison method on recent land transaction which has taken place in area and surrounding areas. In addition the valuer has also considered the recent exercise which MCA conducted in the area. That said, however, being a rural area where transactions of properties are not normally registered, the valuer relied on information on sale of properties given by people in the area itself besides having consultation with some other business people close to the area. In the absence of such information

the valuer has applied Contractor's Method to determine the rate value/m². Comparison method is the most preferred method in the industry and is favored. Direct comparison is seen as the most preferred method as it can be compared against recent transactions which provide the most accurate representation of market trends and is described as 'the conventional valuation technique'

5.3 Contractor's Method

For the improvements lost as sales are rare if not non-existent in this area, the contractor's Method was relied upon. This method, alternatively known as the Cost Approach or Depreciated Replacement Cost (DRC), is used for properties for which there is no market or for which there is insufficient direct comparable market evidence. This method analyses the cost of constructions on replacement basis. In this approach, the costs of building materials, labour, transportation and any other expenses incurred during construction is analyzed. Straight line depreciation is used to bring the cost of structure whose materials, labor and transportation is calculated hypothetically to current position and thus arrived at the compensation rate payable (refer to the Market research results attached).



5.4 Tree Assessment

Unlike the assessment of land, the tree assessment was based on Malawi

Government Gazette of 2010. This provides different approaches for assessment of trees for both commercial and domestic purposes. In view of this report which is the subject, assessment for commercial purposes has been considered to be more reasonable. An adjustment of 100% has been made to rate provided by the Forestry department to cater for the prevailing market trends.

5.5 Fruit Tree Assessment

In terms of the assessment of fruit trees a consideration was made to use the average yield/tree/year, average current market price and expected productive life span. Fruit Compensation schedule attached and number of each claimant's fruit trees, the assessors obtained the compensation payable to each fruit tree owner basing on the current market.

Considering the productive life only, the establishment cost was calculated by averaging the cost of a tree with the duration and longest duration to production. In calculating the yield per fruit tree and average prices, the assessor disregarded the size of the trees as is the case with forest tree above.

6.0 STATEMENT OF COMPENSATION

We certify that compensation assessment value for the acquisition of the land, building and trees is in the sum of **K 156,447,891.25 (One Hundred Fifty-Six Million Four Hundred Forty-Seven Thousand Eight Hundred Ninety-One Kwacha Twenty –Five Tambala).**

7.0 DISCLOSURE

In accordance to our normal practice, the report is for the stated purpose and for the sole use of the client. It is confidential to the client and the client's professional advisors. The Surveyor accepts responsibility to the client

Alone, that the report is prepared with skill, care and diligence reasonably to be expected of a competent Valuation Surveyor, but accepts no responsibility whatsoever to any parties other than the client. Therefore neither the whole nor any part of this report or references thereto should be included in any published document, circular or statement, nor published in any way without prior written approval from the Surveyor. Any such parties who may rely on this report for any other purpose rather than the intended purpose may do so at their own risk.

8.0 VALIDATION OF THE VALUATION

The above value is based on the date of inspection and may be regarded as valid for six months period from the date hereof unless there is a substantial material change of condition of the same for or within the stated period.

It is now our pleasure to submit to you the attached maps of the area showing individual parcels of land for each affected persons and assessment schedule which includes location, name of beneficiaries, size of land, name and number of trees, name of crops, name and number of structures and amount in Malawi Kwacha.

9.0 RECOMMENDATION

It is recommended that payment of compensation money be done before the project commences. Payment should be done at once, and if possible everyone should be paid at the same time. After payment, the beneficiaries should be given time limit to salvage their belongings if any and an agreement should be made with the village headmen and other stakeholders on the commencement of the project.

R. Sikoti
For/The Regional Commissioner for Lands ©
Dated 16th August, 2017

APPENDIX A: MARKET RESEARCH RESULTS

MARKET RESEARCH FOR COMPENSATION OF PROPERTIES FOR SOLAR POWER GENERATION STATION AT KAZIMBE VILLAGE IN SALIMA DISTRICT

The market research to determine the cost per square meter of structures in affected area was conducted at some strategic points and surrounding areas. The results of the research are as in Tables 1 and 2 below.

This research was dependent on structures already identified in the area where the project is being implemented. This has necessitated a disregard to some extent of the categories of the structures as carried on the amended building appraisal form. Another set of building categories evolved. As shown on the attachment, there are eight categories now encompassing structures made up of reeds/grass on the sides and on the roof, to those made of burnt bricks, cement mortar and iron roofed. To arrive at our estimate of the cost per square meter, consideration was made regarding:

- The total acquisition cost of all building materials whether locally found in the area or found elsewhere.
- The total cost of transportation of the materials to the site
- The total cost of labour in construction/erecting the structure

It will be noted that construction statistics in the rural areas of Malawi are not recorded. The Department of Buildings of Malawi Government has some statistics regarding cost/m² of building structures. However, such statistics cover mostly the urban and semi-urban areas. If the department or any other body happens to have constructed a structure in the rural areas, it might be schools, teacher's house, clinics and staff houses.

These cannot offer us a good benchmark for cost per square metre of structures in these rural areas, especially in this case where no building is seen to be a

match of those standard buildings for government officers. Hence the only option remaining was to consult the labourers how they would charge construction of a building of a particular size. This could be realistic for such a service. This also could be true for transportation costs of materials to the site. For the cost of materials, inquiries were made from the structure owners and at some selling points.

Furthermore, it is given that in the rural areas labour related to the construction of a house or any structure is usually done by the head of the households **except in situations where a 'decent' house is planned**. Such labour is not interpreted in monetary terms. This posed a challenge to the estimation of labour cost. However, due diligence was applied to consult different labour service providers as to how much they would charge to erect a structure of a particular size

Having got the costs of each material required for the structure in question, labour and transportation cost; having also got the hypothetical size of the building at hand, the cost per square metre of that type of the building was determined.

Using the above method, the estimated costs per square metre of the categories of building A-H were obtained together with other structures like Kraals, Barns/granaries. It happens that some bathrooms are not roofed. These were considered in a similar way to open kraals and fences i.e. cost per metre was developed.

Type A- Reed/Grass House

Our search revealed that, a medium bundle of grass costs K 250.00 each and a house of about 6m by 4m (24m²) requires about 40 bundles. This could be with or without plastic paper cover on the roof. Each pole was found to be K 120.00 to

K 250.00 if bought. This house would normally need 200 poles just for round the four walls. Depending on the demarcations inside, the number of poles may exceed this amount. Cost of labour required is in region of K 25,000.00. Transportation costs were estimated at K 10,000.00. We consider K 2,500.00/m² to be fair for this type of structures.

MATERIALS	UNIT RATE(MK)	REMARKS
Grass	K 200.00/Bundle	
Poles	K 250.00/each	Depending on type
Bamboos	K 150.00	

Table 1: Cost Materials

Type B-Mud and Wattle

This type of structure requires a lot more poles than the one above. Within a meter, it is expected to have at least eight poles or more. This will give us close to 300 poles for our standard structure of about 24m² round the four walls disregarding the internal demarcations. Unlike grass thatched house, this also requires more bamboos and preparation of mud for walls. This necessitated the rise of transportation cost K 10,000.00 to K 12,000.00. They may also increase to region of K 30,000.00. Therefore, depending on the finishing of the structure, the cost per square meter was pegged at K 5,000.00 to K 10,000.00.

Type C: Sun-dried bricks, grass thatched roof, earth floor

Depending on size of the bricks, most sun-dried bricks were found to be in the ranges of K 5.00 to K 10.00 each. About 7000 - 10,000 bricks were found to be enough for a 24m² house. Transportation cost is lower as often times the bricks are moulded close to the site. Labour was found to be K 15,000.00 to K 30,000.00. Having considered most factors and cost involved in the preparation and erecting of the structure, a cost/sq. m of K 9,000.00 to K 12,000.00 was regarded as fair.

Type D: Sun-dried bricks, iron roofed, earth floor

The structure in all respects is considered to be like that of type C except that it

is iron roofed. Iron sheets are sold slightly over K 2,450.00 per 10ft sheet, planks are usually required. The planks were found to be sold at K 1,000.00 per 17ft. considering these additional costs, the cost per square meter for this structure has been considered to be in the region of K 9,000.00 to K 15,000.00.

Type E-Burnt brick, grass thatched roof, earth floor

This structure differs from the type C in two respects- it is built of burnt bricks and is iron roofed. Burnt bricks are more expensive than sun-dried bricks. It was said to be between K 5.00 to K 7.00 each. Basing on this, the cost per square meter of such structures was considered to be between K 10,000.00 to K 13,000.00.

Type F-Burnt bricks, iron roofed, earth floor

The only difference here with type E is roofing. This as shown earlier, goes along with planks which add to the cost. Hence this type was pegged at K 13,000.00 to K 18,000.00 per square meter.

Type G-Burnt bricks, iron roofed, cement floor

This represents one of the best types from the area. Still the difference with type E is the floor. While type F is earth floored, type G has a cement floor. A bag of cement was found to cost around K 6,500.00. When this cost was factored in, coupled with high transportation costs for cement, burnt bricks, sand and cost of labour in the excesses of K 50,000.00 to K 70,000.00, the cost per square meter came to around K 25,000.00 to K 30,000.00

Type H-Burnt brick built walls, cement pointing with corrugated iron roofing sheets

The use of cement mortar and cement pointing marks the difference between this type and the type G above. Thus, more cement is required in this structure. Accordingly, the cost per square meter has been pegged at K 25,000.00 to K 30,000.00 per square meter.

Other structures

It will be noted that supporting structures have lower costs per square meter. It is common knowledge that condition of supporting structures like kitchens, washrooms, pit latrines and others is usually below that of the main houses although built with the same materials. The skills and labour input is usually lower than that required for the main buildings. Further to that, while the main structures above have usually glazed windows or shutters and also wooden doors, supporting structures may not have any of these. They may have grass/reed doors and no windows at all. This can explain why such structures have their costs lowered.

It may be noted too that while some structures are made of similar materials, but the costing is different because of difference in the size of materials used, the skill and time taken to complete each one.

Finally, while this market research has tried to capture what might be considered to be close estimates of transportation costs, material costs and labour, it has been accepted that there were challenges in deducing and arriving at the costs themselves because most labour services in the rural areas are not attached to monetary terms.

Therefore, we are of the view that this is the closest we could get to and that this represents a fair and reasonable cost of materials, labour and transport.

Government Notice No.23

FORESTRY ACT

(CAP.63:03)

FORESTRY (AMMENDMENT) RULES 2010

IN EXERCISE of the powers conferred by section 86 of the Forestry Act, I GRAIN WYSON MALUNGA, Minister of Natural Resources, Energy and Environment, make the following Rules:-

1.	These, 2010. Rules may be cited as the Forestry (Amendment) Rules	Citation
2.	The Second schedule to the Forestry Rules (hereinafter referred to as the "principle Rules" is	Replacement
	Revoked and replaced by the following new schedule:-	of the second
	schedule to the Forest Rules.	

SECOND SCHEDULE			(r. 13(1))	
ROYALTIES			(para. 2)	
1.	INDEGENOUS TREES		Price per cubic metre	
	Botanical Name	Vernacular Name	K	t
Class i	Khaya anthotheca	Mbawa, Muwawa, Bulamwiko	15,000	00
	Entandrophagma excelsum	Mukarikari, Mululu	15,000	00
	Adima microcephala	Mwenya, Chonya, Mwina, Mungwina, Mug'ona		
		Mgwenya, Mluona	15,000	00
	Chloroffhora excelsa	Ngunda, Mvule	15,000	00
	Combretum imberbe	Msimbiti	15,000	00
	Tricilia enotica	Mzikidzi, Msynguti	15,000	00
	Colophospermum mopane	Tsanya, Sanya, Ntsano, Mopani, Mpani	15,000	00
	Dalbergia melanxylon	Pingo, Kasalusalu, Nanyula, Kasarusaru	15,000	00
	Pterocarpus angolensis	Mlombwa, Mtumbati, Mbira, Nawazi	15,000	00
	Pericopsis angelensis	Muwanga, Mubanga, Mabanga, mwanga	15,000	00
Class ii	Ocotea usambarensis	Bokoto	8,000	00
	Strombosia scheffleri	Mvivi	8,000	00
	Entandrophagram caudatum	Nayalai, Naplalali, Gundang'oma	8,000	00
	Apodytes dimidiata	Mzaza, Katole, Mchima, Msuwi, Mtibolo		
		Mnyembebe	8,000	00
	Burttidavya nyasica	Mbule	8,000	00
	Albizia gummifera	Mtangatanga, Bua, Chikwani, Chicololo, Mpepe		
		Msenjere, Mkalankhanga, Skapya	8,000	00
	Azelia quanzensis	Mkongomwa, Msambamfumu, Mpapa, Ipapa		

		Mpapedende, Msokosa, Chikunda, Mnangaliondo		
		Mkogwa	8,000	00
	Newtonia buchannii	Mkweranyani	8,000	00
	Podocarpus species	Nanjula, Mwenye, Mkachi, Mkanguni, Mkute	8,000	00
	Burkea Africana	Mkalati, Kalinguti, Kawidzu, Kapanga	8,000	00
	Bombax stoltzii	Mtojeranga, Thonjemanga	8,000	00
	Swartzia madagascarensis	Chinyenye, Kampango	8,000	00
Class iii	Chrysophyllum species	Mutu, Chifira, Mufu, Njundo, Njale, Namazuwa,		
		Mlombeya	8,000	00
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		Chitondo, Muyamba	8,000	00
	Diospyros mesopiliforms	Msumwa, Mchenje, Mchena, Njelenje	8,000	00
	Dialiopsis Africana	Mtalala, Mlimbauta, Masakala, Mtutumuko		
		Chiwangalanya	8,000	00
	Faurea species	Masese, Chinsese, Chiye	8,000	00
	Mitragyna rubrostipuluta	Mufwafwada	8,000	00
	Cordyla Africa	Mtondo	8,000	00
	Polyscias fulva	Mpembati, Mukwajo, Mwaja, Mwaza	8,000	00
	Terminalia, sericea	Naphini, Mpululu, Njoyi, Nalinsi, Gonondo	8,000	00
	Facolhoa larifolia	Ndopa, Mlunganya, Muuse	8,000	00
	Bridelia micrantha	Mpasa, Msopa, Mlewezi, Mwisya, Chisopa		
		Msongamiso	8,000	00
	Mitragyna rubrostipulata	Mkwerete, Mkhwalé, Mthethe, Chingogolo	8,000	00
	Acacia Polycantha	Mgobe	8,000	00
	Rauvolfia caffra	Mwembi, Mvumbamvula, Nanyungu, Muimbi	8,000	00
		Munyezani, Nyesani		
Class iv	Parkia filicoida	Mkundi, Musyepwa, Mgundi	8,000	00
	Xymalos nomospora	Mulaka, Mpelekeso, Mpekeso, Nakaswaga	8,000	00
		Chikalaka		
	Fargara species	Pupwe, Mkurungu, Mlunguchulu	8,000	00
	Vitex doniana	Mpindimbi, Mfuru, Msimpysa, Mpyambya		
		Mpsyimpsya	8,000	00
Class v	All other non-planted species		8,000	00
Class vi	Widdringtonia cupressoides	Mkunguza, Mulanje Cedar	20,000	00
	Juniperus procera	Changalume	20,000	00
2.	EXOTIC TREES			
	Cypress species	Mkunguza	10,000	00
	Eucalyptus species	Bulugamu	10,000	00
	Gmellina arborea	Malayina	10,000	00

	Pinus species	Payini	10,000	00
3.	POLES			
	Species	Butt diameter over bark		
		(in centimetres)		
	Eucalyptus and other exotic			
	Species not specified			
	Elsewhere in this schedule	less than 6	80	00
		6 but less than 8	100	00
		8 but less than 10	160	00
		10 but less than 12	200	00
		12 but less than 14	240	00
		14 but less than 16	300	00
		16 but less than 18	320	00
		18 but less than 20	240	00
		20 and over	by volume	
	Indigenous species	less than 6	100	00
		6 but less than 8	160	00
		8 but less than 10	200	00
		10 but less than 12	240	00
		12 but less than 14	320	00
		14 but less than 16	340	00
		16 but less than 18	360	00
		18 but less than 20	380	00
		20 and over	By volume	
4.	FUELWOOD			
	Type			
	Exotic fuelwood, cut and			
	Stacked by purchaser	(a) domestic use	700	00
		(b) industrial use	1,000	00
	Indigenous fuelwood, cut and			
	Stacked by purchaser	(a) domestic use	700	00
		(b) industrial use	2,500	00
	Exotic fuelwood, per headload		20	00
	Indigenous fuelwood, per headload		150	00
	Indigenous fuelwood, per bicycle		200	00

5.	BAMBOO				
	Butt diameter(in centimeter)				
	Less than 5			10	00
	5 but less than 10			30	00
	10 and over			50	00
6.	PALMS				
	Phoenix reclinata	Kanjedza, Kanchinga, Kanjesa		3,000	00
	Hyphanena crinata	Mgwalangwa, Makoma		3,000	00
	Borassus aethiopium	Mvumo, Makoma		3,000	00
7.	PLANTS				
	Type				
	Wild Cycadas ans succulents			3,000	00

8. NON-WOOD FOREST PRODUCTS (NWFP)

Type

Fruits, vegetables, mushrooms

Caterpillars,insects, tubes, tubers,thatch grass

(a) domestic use

free

(b) commercial use

by agreement

9. OTHER FOREST PRODUCE

Royalties in respective other forest produce may be determined by agreement Between the Director of Forest and the buyer.

10. DISCRPTION

The Director of Forest may sell forest produce in this schedule by competitive Bidding

Phase II Report

Telephone: (265) 01 774 766
Fax: (265) 01 772 523
E-mail: lands@globemw.net



**MINISTRY OF LANDS, HOUSING AND
URBAN DEVELOPMENT
PRIVATE BAG 311
CAPITAL CITY
LILONGWE 3
MALAWI**

Please address all communications
to:
Secretary for Lands, Housing and
Urban Development

COMPENSATION ASSESSMENT OF LAND, FRUIT, INDIGENOUS AND EXOTIC TREES
FOR THE EXTENTION OF A PROPOSED SITE FOR CONSTRUCTION OF A SOLAR POWER
GENERATION STATION AT KAZIMBE VILLAGE TRADITIONAL AUTHORITY KARONGA IN
SALIMA DISTRICT.

Prepared by:

The Commissioner for Lands
Private Bag 311
LILONGWE 3

Prepared for:

The Chief Executive Officer
JCM

P.O Box
SALIMA

Dated 24TH AUGUST, 2018

Telephone: (265) 01 774 766
Fax: (265) 01 772 523
E-mail: lands@globemw.net



**MINISTRY OF LANDS, HOUSING AND
URBAN DEVELOPMENT
PRIVATE BAG 311
CAPITAL CITY
LILONGWE 3
MALAWI**

Please address all communications
to:
Secretary for Lands, Housing and
Urban Development

REF NO: CL/GC/424

24TH AUGUST, 2018

The Chief Executive Officer
JCM
P.O Box
Salima

Cc: The District Commissioner
Salima District Council
Private Bag 1
Salima

Dear Sir,

COMPENSATION ASSESSMENT OF LAND, FRUIT, INDIGENOUS AND EXOTIC TREES
FOR THE EXTENTION OF A PROPOSED SITE FOR CONSTRUCTION OF A SOLAR POWER
GENERATION STATION AT KAZIMBE VILLAGE TRADITIONAL AUTHORITY KARONGA IN
SALIMA DISTRICT.

1.0 INSTRUCTION

Reference is made to the above subject matter.

In accordance with your request and instruction given to us to assess
compensation values payable to beneficiaries affected by the proposed

construction of solar generation station at Kazimbe village Traditional authority Karonga in Salima District. I write to confirm that we have had an opportunity of verifying, analyzing and assessing assets in the project affected area and we had also made enquiries and obtained such further information that we deemed necessary to derive the opinion as to the current values of buildings, land and trees for compensation purposes.

We now certify that having considered all relevant factors regarding the current market values of land, exotic, indigenous and fruit trees in these areas and based on our knowledge of the market we are of the opinion that the total preliminary compensation values for land, buildings, exotic, indigenous and fruit trees as at 24th August, 2018 is in the sum of MK 317,520,800.73 (Three Hundred Seventeen Million Five Hundred- Twenty Thousand Eight Hundred Malawi Kwacha Seventy – Three Tambala).

PURPOSE OF VALUATION

This valuation is for compensation of buildings, land and trees in an area proposed for the construction of a solar power generation station at Group Village Headmen Kazimbe, Mayambo, Sadzu, Jeputala and Waya in Traditional Authority Kalonga in Salima District.

3.0 LAND/PLOT EXTENT

According to the preliminary survey carried out by members of staff from The Regional Surveyor General Centre and of the consultant the area to be appropriated extends to approximately 104.87 hectares.

4.0 PROPERTY TENURE STATUS

According to records which are kept at Lilongwe Land Registry at Tikwere House floor No. 6 indicates that the land in question is customary in nature.

5.0 BASIS OF PROPERTY OWNERSHIP

The subject property is owned by different individual from surrounding villages and it is being used for cultivation of crops and animal grazing fields

6.0 BASIS OF VALUATION

The basis used for this valuation is market value (MV), which is defined as follows:- "the estimated amount for which an asset or liability should exchange on the valuation date between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion" (RICS valuation standards-global & UK, 2011).

7.0 EXTENT OF INVESTIGATIONS

Information obtained around Salima District Council has been relied upon to a great extent especially on land, forest and fruit trees. In some cases some information on fruit trees was obtained from Chitedze Research Station in Lilongwe and some from the markets on the assessment of fruit trees and indigenous trees. Property market research was conducted in the District especially along the stretch of the land. The research was done by enquiring cost of building of material around the area through random sampling method. Further enquiries were made on cost land for different purposes i.e. agricultural land; the attached appendix (appendix A) shows the results of the market research i.e. the forest act (act. 63:03) forestry (amendment) rules 2010 . These forestry rules indicates cost various kinds of trees both exotic and indigenous. The survey which was conducted identified ownership of land parcels and

subsequently buildings and trees. The areas of land parcels established by the surveyors have been used to arrive at compensation payable for land taken. For the purpose of this report, we have accepted and relied upon the information with which we have been supplied on the assumption that it is both accurate and complete.

8.0 STATEMENT OF APPROACH

There are several principles that have governed this assessment for compensation of the properties along this stretch:

Section 29(1&2) of the Constitution of Malawi says "every person shall be able to acquire property." and that having acquired that property "no person shall be arbitrarily deprived of such property Section 28 of the Land act (Cap 57:01) provides that any person who suffers any disturbance of, or loss or damage to any interest which he had shall be compensated for such disturbance, loss or damage as is reasonable.

The land Acquisition Act (Cap. 58:04) Section 9 & 10, this Act Provides for the procedures to be followed to assess fair compensation. However, the stipulations in this Act can be superseded by what can be agreed between the parties See Section 10(1).

Chap.4:16 of the Malawi Land Policy (2000) provides for payment of compensation for Customary Land based on open market value (In the meantime, Malawian Laws do not provide for assessment for injurious affection and severance though these heads of claims have been proposed by Special Law commission).

The World Bank's Safeguard Policy OP 4:12 applies to all project-affected people regardless of the number of people affected, the severity of impact and the legality of land holding. It calls for particular attention to the needs of

the vulnerable groups especially those below poverty line, the landless, the elderly, women and children, indigenous groups, ethnic minorities and other disadvantaged persons.

9.0 LAND PARTICULARS

The description of the land falls within the jurisdiction of Traditional authority Kalonga in Salima District.

9.1 The Terrain Of The Area

The land to be expropriated is generally flat land. The land is currently used for agricultural purposes and is currently under customary Law. Some of the crops which are being cultivated in the area include maize, groundnuts, beans, soya and cotton among others. Almost around every home stead, there are trees, such as natural and planted, fruit trees and shrubs almost around the area. It is not uncommon to find these trees in the gardens. Fruit trees such as mangoes are for commercial purposes. The people in this area also rear livestock like cattle, goat and pigs.

9.2 Locality and the Surrounding Areas

Expectedly, the area being rural in nature is served by gravel roads. The area is about five Kilometers from the M 5 Salima-Lilongwe road which turns to the left a few meters before Nanjoka sub-station as one drives from Lilongwe to Salima junction. The main road is that of Lilongwe-Salima M5 road. This road connects Lilongwe-Salima-Nkhota-Kota and Blantyre. Improvements on the land to be appropriated consist of one uncompleted dwelling house built with common burnt bricks covered with corrugated iron sheets. The area has a thriving commercial Centre-Kazimbe which provides the area with groceries and some daily necessities.

9.3 Soil Texture

Though a scientific research has not been carried out but information gathered from the locals indicate that the soil is very fertile therefore making it ideal for agricultural activities and produce good yield of crops such as maize and cotton.

10.0 PURPOSE OF THE PROPOSED ACQUISITION

The land is being required for the extension of the construction of proposed solar power generation station. The primary usage of this station to increase the electricity power supply capacity to the main Escom grid.

11.0 BASIS OF COMPENSATION

Based on the provisions of The Malawi National Land policy (2002) Chap. 4:16 The World Bank's Safeguard Policy OP 4.12 and Land Act Cap. 57:01, Section 28; Land Acquisition Act (CAP. 58:04 the project – affected people will be compensated for:

- (i) land taken regardless of the "legality of landholding"
- (ii) Loss of livelihood by compensating for fruit, exotic and indigenous trees that maybe destroyed.
- (iii) Loss of buildings
- (iv) Loss of business

11.1 MARKET VALUE ASSESSMENT

In assessing the market value of the land and buildings to be taken, the valuer considered that the value of land and buildings to be taken is the amount which the land and buildings could acquire if sold in an open market by a willing seller might be expected to realize, according to the rules of land and buildings compensation. Further to that, that no allowance was made on account of land and buildings being acquired compulsorily. Neither was the special suitability or adaptability of the land for any purpose taken into account if that purpose could

be a purpose to which it could be applied only in pursuance of the statutory powers.

11.2 Disturbance

The fundamental principle in compulsory acquisition compensation is the amount so far as money can do so, to put the owner in the same position as if his property has not been acquired. Therefore, compensating the owner at the market value for the property taken from him goes only part of the way to attain this end. So, in addition, monetary compensation has to be payable to reimburse the claimant for 'disturbance' or any other matter not directly based on the value of the property.

Disturbance compensation is a sum added to the purchase price of the property compulsorily acquired. It is not payable in respect of the property retained by the claimant. First there is an acquisition price and, if there is such a price disturbance compensation can be included in it. From elsewhere, the Milledge principle based on *Commonwealth v Milledge* (1953), better explains the notion of disturbance. In part it says:

"Disturbance, is relevant only to the assessment of the difference between, on the one hand, the value of the property to a hypothetical purchaser the kind of use to which the owner was putting it at date of resumption, and on the other hand, the value of the property to the actual owner himself for the precise use to which he was putting it at that date."

It is therefore, noteworthy that compensation for the affected properties taken plus disturbance will not always fulfill the requirements of the principle expressed above. There is an idea of severance and injurious affection which has not been included in this assessment as the current law does not stipulate its use.

The disturbance allowance to be added to the project Affected people related to:

Cost related to identification of replacement land

Bush clearing on the identified alternative land

Cost of transportation of salvaged items

Loss of business (This will include revenue lost during transitional period from the time of evacuation to relocation)

11.3 .Vulnerable Groups

A monetary consideration has also been provided for the vulnerable group by way of a percentage of the total compensation amount payable. This group was identified by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage, or social status.

At a more specific level it refers to those social categories whose livelihoods may be particularly vulnerable to disturbances created by the Project, for which special provisions need be made so that they are better equipped to deal with Project-induced changes. Households classified as 'vulnerable' are affected households who may, by virtue of gender, ethnicity, age, physical or mental disability, economic disadvantage or social status, be particularly vulnerable to Project implementation, and changes induced by the Project. These may include:

- Women-headed households;
- Households with an aged household head older than 65 years;
- Child-headed households (headed by children under the age of 18);
- Households where the household head has a physical or mental disability;

- Households with no or limited access to cash income, and have high levels of unemployment amongst the household members; and
- Households with a low nutritional base, measured through current nutritional intake and requirements, agricultural and/or livestock farming activities, employment and other off farm activities.

Vulnerable groups were identified based on census and social economic surveys carried out by social-economic survey team, however, Individual support measures for vulnerable people will be identified prior to the implementation of the RAP during the exit Survey. The respective consultations will be undertaken under the lead of Project Implementation Unit, through project committees.

12 VALUATION APPROACH

12.1 Methodology

The methodology applied to determine the value of land is comparison method and for trees and improvements on the land the method applied is Contractor's Method and or replacement cost.

12.1.1 Direct Comparison Method

This method compares the subject property with the prices obtained for other similar properties almost at the same point in time. As for the value of land the valuer has applied comparison method on recent land transaction which has taken place in area and surrounding areas. In addition the valuer has also considered the recent exercise which was conducted in the area for the same project. That said, however, being a rural area where transactions of properties are not normally registered, the valuer relied on information on sale of properties and land given by people in the area itself besides having consultation with some other business people close to the area. In the absence of such information the valuer has applied comparison on land transactions.

Comparison method is the most preferred method in the industry and is favored. Direct comparison is seen as the most preferred method as it can be compared against recent transactions which provide the most accurate representation of market trends and is described as 'the conventional valuation technique'

Having considered the information given in the area and its proximity, K 2,000,000.00 was adopted as value of land per hectare for this compensation exercise.

Tree Assessment

Unlike the assessment of land, the tree assessment was based on Malawi Government Gazette of 2010. This provides different approaches for assessment of trees for both commercial and domestic purposes. In view of this report which is the subject, assessment for commercial purposes has been considered to be more reasonable. An adjustment of 100% has been made to rate provided by the Forestry department to cater for the prevailing market trends.

Fruit Tree Assessment

In terms of the assessment of fruit trees a consideration was made to use the average yield/tree/year, average current market price and expected productive life span. Fruit Compensation schedule attached and number of each claimant's fruit trees, the assessors obtained the compensation payable to each fruit tree owner basing on the current market.

Considering the productive life only, the establishment cost was calculated by averaging the cost of a tree with the duration and longest duration to production. In calculating the yield per fruit tree and average prices, the assessor disregarded the size of the trees as is the case with forest tree above.

13 STATEMENT OF COMPENSATION

We certify that preliminary compensation assessment value for the acquisition of the land, building and trees is in the sum of MK 317,520,800.73 (Three Hundred Seventeen Million Five Hundred- Twenty Thousand Eight Hundred Malawi Kwacha Seventy –Three Tambala).

14.0 DISCLOSURE

In accordance to our normal practice, the report is for the stated purpose and for the sole use of the client. It is confidential to the client and the client's professional advisors. The Surveyor accepts responsibility to the client alone, that the report is prepared with skill, care and diligence reasonably to be expected of a competent Valuation Surveyor ,but accepts no responsibility whatsoever to any parties other than the client. Therefore neither the whole nor any part of this report or references thereto should be included in any published document, circular or statement, nor published in any way without prior written approval from the Surveyor. Any such parties who may rely on this report for any other purpose rather than the intended purpose may do so at their own risk.

15.0 VALIDATION OF THE VALUATION

The above value is based on the date of inspection and may be regarded as valid for six months period from the date hereof unless there is a substantial material change of condition of the same for or within the stated period.

16.0 RECOMMENDATIONS

It is recommended that payment of compensation money be done before the project commences. Payment should be done at once, and if possible everyone should be paid at the same time. After payment, the beneficiaries should be given time limit to salvage their belongings if any and an agreement should be made with the village headmen and other stakeholders on the commencement of the project.

E.C BOTA (MSIM) MA REAL MANAGEMENT (UWE) BRISTOL UK
Registered Valuation Surveyor

For: THE SECRETARY OF LANDS, HOUSING AND URBAN DEVELOPMENT

The Malawi Gazette Supplement, dated December, 2010

Government Notice No.23

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(CAP.63:03)

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	<i>Chloroffhora excels</i>	Ngunda, Mvule	15,000	00
	<i>Combretum imberbe</i>	Msimbiti	15,000	00
	<i>Tricilia enotica</i>	Mzikidzi, Msynguti	1 5,000	00
	<i>Colophospermum mopane</i>	Tsanya, Sanya, Ntsano, Mopani, Mpani	15,000	00
	<i>Dalbergia melanxylon</i>	Pingo, Kasalusalu, Nanyula, Kasarusaru	15,000	00
	<i>Pterocarpus angolensis</i>	Mlombwa, Mtumbati, Mbira, Nawazi	15,000	00
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Class ii	<i>Ocotea usambarensis</i>	Bokoto	8,000	00
	<i>Strombosia scheffleri</i>	Mvivi	8,000	00
	<i>Entandrophargram caudatum</i>	Nayalai, Naplalali, Gundang'oma	8,000	00
	<i>Apodytes dimidiata</i>	Mzaza, Katole, Mchima, Msuwi, Mtibolo		
		Mnyembewe	8,000	00
	<i>Burttidavia nyasica</i>	Mbule	8,000	00
	<i>Albizia gummifera</i>	Mtangatanga, Bua, Chikwani, Chicololo, Mpepe		
		Msenjere, Mkalankhanga, Skapya	8,000	00
	<i>Afzelia quanzensis</i>	Mkongomwa, Msambamfumu, Mpapa, Ipapa		
		Mpapidende, Msokosa, Chikunda, Mnangaliondo		
		Mkogwa	8,000	00
	<i>Newtonia buchannii</i>	Mkweranyani	8,000	00
	<i>Podocarpus species</i>	Nanjula, Mwenye, Mkachi, Mkanguni, Mkute	8,000	00
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	<i>Diospyros mesopiliforms</i>	Msumwa, Mchenje, Mchena, Njelenje	8,000	00
	<i>Dialiopsis Africana</i>	Mtalala, Mlimbauta, Masakala, Mtutumuko		
		Chiwangalanya	8,000	00
	<i>Faurea species</i>	Masese, Chinsese, Chiere	8,000	00
	<i>Mitragyna rubrostipulata</i>	Mufwafwada	8,000	00
	<i>Cordyla Africa</i>	Mtondo	8,000	00
	<i>Polyscias fulva</i>	Mpembati, Mukwajo, Mwaja, Mwaza	8,000	00
	<i>Terminalia, sericea</i>	Naphini, Mpululu, Njoyi, Nalinsi, Gonondo	8,000	00
	<i>Facolhoa larifolia</i>	Ndopa, Mlunganya, Muuse	8,000	00
	<i>Bridelia micrantha</i>	Mpasa, Msopa, Mlewezi, Mwisya, Chisopa		
		Msongamiso	8,000	00
	<i>Mitragyna rubrostipulata</i>	Mkwerete, Mkhwale, Mthethe, Chingogolo	8,000	00
	<i>Acacia Polycantha</i>	Mgobe	8,000	00
	<i>Rauvolfia caffra</i>	Mwembi, Mvumbamvula, Nanyungu, Muimbi	8,000	00
		Munyezani, Nyesani		
Class iv	<i>Parkia filicoida</i>	Mkundi, Musyepwa, Mgundi	8,000	00
	<i>Xymalos nomospora</i>	Mulaka, Mpelekeso, Mpekeso, Nakaswaga	8,000	00
		Chikakalaka		
	<i>Fargara species</i>	Pupwe, Mkurungu, Mlunguchulu	8,000	00
	<i>Vitex doniana</i>	Mpindimbi, Mfuru, Msimpysa, Mpyambya		
		Mpsyimpsya	8,000	00

Class v	All other non-planted species		8,000	00
Class vi	Widdringtonia cuppresoides	Mkunguza, Mulanje Cedar	20,000	00
	Juniperus procera	Changalume	20,000	00
2.	EXOTIC TREES			
	Cypress species	Mkunguza	10,000	00
	Eucalyptus species	Bulugamu	10,000	00
	Gmellina arborea	Malayina	10,000	00
	Pinus species	Payini	10,000	00
3.	POLES			
	Species	Butt diameter over bark		
		(in centimetres)		
	Eucalyptus and other exotic			
	Species not specified			
	Elsewhere in this schedule	less than 6	80	00
		6 but less than 8	100	00
		8 but less than 10	160	00
		10 but less than 12	200	00
		12 but less than 14	240	00
		14 but less than 16	300	00
		16 but less than 18	320	00
		18 but less than 20	240	00
		20 and over	by volume	

	Indigenous species	less than 6	100	00
		6 but less than 8	160	00
		8 but less than 10	200	00
		10 but less than 12	240	00
		12 but less than 14	320	00
		14 but less than 16	340	00
		16 but less than 18	360	00
		18 but less than 20	380	00
		20 and over	By volume	
4.	FUELWOOD			
	Type			
	Exotic fuelwood, cut and			
	Stacked by purchaser	(a) domestic use	700	00
		(b) industrial use	1,000	00
	Indigenous fuelwood, cut and			
	Stacked by purchaser	(a) domestic use	700	00
		(b) industrial use	2,500	00
	Exotic fuelwood, per headload		20	00
	Indigenous fuelwood, per headload		150	00
	Indigenous fuelwood, per bicycle		200	00

5.	BAMBOO				
	Butt diameter(in centimeter)				
	Less than 5			10	00
	5 but less than 10			30	00
	10 and over			50	00
6.	PALMS				
	Phoenix reclinata	Kanjedza, Kanchinga, Kanjesa		3,000	00
	Hyphanena crinata	Mgwalangwa, Makoma		3,000	00
	Borassus aethiopium	Mvumo, Makoma		3,000	00
7.	PLANTS				
	Type				
	Wild Cycadas ans succulents			3,000	00

8. NON-WOOD FOREST PRODUCTS (NWFP)

Type

Fruits, vegetables, mushrooms

Caterpillars,insects, tubes, tubers,thatch grass

(a) domestic use

free

(b) commercial use

by agreement

9. OTHER FOREST PRODUCE

Royalties in respect of other forest produce may be determined by agreement between the Director of Forest and the buyer.

10. DESCRIPTION

The Director of Forest may sell forest produce in this schedule by competitive Bidding

ERM has over 160 offices across the following countries and territories worldwide.

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