

Environmental and Social Impact Assessment Report



Rehabilitation of Benga to Dwangwa M005 Road Section and Associated Feeder Roads

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EXECUTIVE SUMMARY

1. Overview of the project

The Government of Malawi, with support from the African Development Bank (AfDB), is undertaking the comprehensive rehabilitation and upgrade of the M005 road section from Benga to Dwangwa, including eleven associated feeder roads. This initiative aligns with Malawi Vision 2063, aiming to develop world-class road networks connecting urban and rural areas to local and international markets. The project involves widening the carriageway, upgrading drainage structures, and improving eleven feeder roads. It will create employment opportunities, promote knowledge transfer, and enhance traffic efficiency and safety.

The rehabilitation covers approximately 100 kilometers, divided into two phases. Phase one, from Benga to Nkhotakota Boma (47km), and phase two, from Nkhotakota Boma to Dwangwa trading Centre (53km). The terrain is predominantly flat with occasional moderate slopes. The eleven feeder roads, including Kalimanjira to Chididi Health Centre, Mwansambo Turnoff to Kayoyo, and others, are also part of the project, enhancing connectivity and accessibility in the area.

The ESIA study was updated to reflect current environmental and socio-economic changes since its initial conduct. This included reassessing baseline conditions, evaluating potential impacts, revising mitigation measures, and ensuring compliance with national and international standards.

Two major options were considered: the "Do Nothing" option and the "Road Rehabilitation" option. The latter involves various technical options for rehabilitating the road, with the complete reconstruction and widening with asphalt concrete dressing chosen for its low maintenance cost and improved road safety.

2. Description of the project

The Benga – Dwangwa (M005 section) road traverses Traditional Authorities (TAs) Mwadzama, Nkhanga, Kalimanjira, Malengachanzi, Mphonde, and Kanyenda in Nkhotakota district, situated approximately 200 kilometers northwest of Lilongwe, Malawi's capital city. As part of the lakeshore road network, it serves as a vital north-south link along the coastal plain between Lake Malawi and the western plateau. Benga and Dwangwa, located at geographical coordinates 13°

22° 0' South, 34° 17' 0" East, and 12° 34' 0" South, 34° 9' 0" East, respectively, mark the endpoints of the road.

The project entails the comprehensive rehabilitation and widening of the carriageway from Benga Catholic Parish to Dwangwa Trading Centre. Estimated at approximately MWK187,776,000,000 (USD 111.55 million), the project signifies a substantial investment in national development. It will be executed in two phases: phase one covers rehabilitation from Benga to Nkhotakota Boma, and phase two extends from Nkhotakota Boma to Dwangwa Trading Centre. The estimated cost of the project is also divided into two phases: Phase I covers the rehabilitation from Benga to Nkhotakota Boma, while Phase II extends from Nkhotakota Boma to Dwangwa Trading Centre. The estimated cost for Phase I is approximately MWK 87,976,000,000 (USD 52.28 million), and for Phase II, it is around MWK 99,800,000,000 (USD 59.27 million).

The scope of work for the Benga to Dwangwa road rehabilitation project includes upgrading a total of 20 bridges along its route. These bridges are categorized into two phases based on their replacement or retention. In Phase I, five new bridges will be constructed, namely Chamakuwi, Kanjamwana, Ling'ona, Mnchandire, and Saliwona, with 1 bridge (Chia) being retained. Phase II, on the other hand, will see the construction of eleven new bridges, including Chamachete, Chizeu, Kaombe, Kasangazi, Khako, Lunga, Mikongwe, Misenjere, Navunde, Tipati, and Walemera, while Bua, Dwangwa, and Liwaladzi will be retained. This phased approach ensures that critical bridge upgrades are efficiently managed, with new bridges being constructed in both phases to enhance the road's safety and capacity while minimizing disruptions to transportation networks. Additionally, the refurbishment and reconstruction of road sections, culverts, and longitudinal drainage systems will be undertaken, along with the replacement of all single-lane bridges with new bridges, totaling 16, including 3 double-lane bridges to address inadequate hydraulic capacity. Furthermore, feeder roads, such as the Kalimanjira to Chididi Health Centre Road, will undergo improvements to enhance connectivity and accessibility.

Employment opportunities will be generated for both skilled and unskilled labor, with at least 70% of employees being local residents. Gender considerations will be prioritized, aiming for at least 40% representation of women in the workforce. Local unskilled labor will receive preference, contributing to community empowerment and economic development

3. Description of the project site and the major environmental and social stakes

Nkhotakota District, is located within the Central African Rift Valley escarpments, boasts unique geographical and ecological features. Situated between the Central African Plateau to the west and Lake Malawi to the east, the targeted M005 road stretch for rehabilitation spans from Benga to Dwangwa. This area experiences minimal topographic variations, characterized by flat terrain with occasional gentle slopes, particularly beyond Kaombe River and Bua River catchment.

The project site encompasses diverse geological formations, ranging from unconsolidated alluvial deposits to faulted physical rock units, such as pegmatite granites and quartz veins. While the unconsolidated materials facilitate construction, areas with physical rock units may necessitate careful earthmoving processes to avoid destabilization. In addition, the district's tropical climate, marked by wet and dry seasons, influences soil types and agricultural practices, with rainfall patterns exhibiting recent erratic behavior.

Hydrologically, the region's terrain influences water flow, with numerous rivers and streams draining from the hilly west to Lake Malawi in the east. Notably, the Chia Lagoon serves as a dynamic hydrological feature, influenced by seasonal variations in lake levels and local precipitation. Water quality assessments indicate acceptable levels, with mitigation measures planned to prevent construction-related contamination.

Biodiversity in Nkhotakota District encompasses a range of plant and animal species, with notable endemic and endangered species observed. While biodiversity studies highlight rich flora and fauna in the district's protected areas, particularly the Nkhotakota Wildlife Reserve, the project activities will be confined within the road reserve boundaries of already existing roads; thus, there will not be any direct threats to the protected areas from the project.

Socio-economic dynamics in Nkhotakota District revolve around agriculture, customary land use practices, and limited healthcare and educational resources. The phased approach to road rehabilitation, spanning from Benga to Nkhotakota Boma (47km) in phase one and from Nkhotakota Boma to Dwangwa Trading Centre (53Km) in phase two, ensures systematic progress. Additionally, improvements to feeder roads, including those like Kalimanjira to Chididi Health Centre, enhance local connectivity and socio-economic development.

Demographically, the district sustains a population engaged in agriculture, with challenges related to healthcare service delivery and increasing demand for educational facilities. The district's income sources primarily stem from agriculture, supplemented by formal employment, business activities, and natural resources. Cultural diversity, with the Chewa community predominating, influences local practices and traditions. Below is the locational map road phases demarcated by the main road.



4. Institutional and legal framework for implementation of the project

4.1 National Policy Framework

The National Policy Framework governing the Benga-Dwangwa (M005 section) road project and its eleven feeder roads encompasses various policies aimed at promoting sustainable development, environmental protection, social equity, and economic growth in Malawi. These

policies are essential for guiding the project's implementation and ensuring its alignment with national development objectives.

- **Constitution of the Republic of Malawi (1995):** Ensures that the project benefits the welfare and development of all citizens, potentially through employment opportunities.
- **Malawi Vision 2063:** Aims for self-reliance and economic prosperity, with infrastructure improvements like the road contributing to achieving these goals.
- **Malawi Growth Development Strategy (MGDS) 2017-2022:** Focuses on poverty reduction through economic growth and infrastructure development, emphasizing environmental protection and social development.
- **National Environmental Policy (2004):** Requires mitigation measures to address environmental impacts of construction activities, such as vegetation clearing and soil excavation.
- **National Forestry Policy (2016):** Advocates for environmental impact assessments to prevent unnecessary destruction of forests along the road route.
- **National Land Policy (2002):** Guides decisions on compensation, resettlement, and protection of natural resources during project implementation.
- **National Gender Policy (2000):** Promotes gender mainstreaming and addresses issues like gender-based violence, ensuring equitable participation and benefits for women.
- **National HIV/AIDS Policy (2012):** Aims to prevent HIV infections and mitigate socio-economic impacts, requiring HIV/AIDS prevention measures for project workers.
- **National Water Policy (2005):** Promotes sustainable water resources management, urging the project to minimize pollution of public water sources.
- **National Sanitation Policy (2006):** Encourages waste reduction, recycling, and safe waste management practices, aligning with project objectives.
- **National Tourism Policy:** Seeks to optimize tourism sector contributions to national income, with road improvements enhancing tourism infrastructure.
- **National Decentralization Policy (1998):** Requires adherence to planning requirements of relevant local authorities for project implementation.

4.2 NATIONAL LEGAL FRAMEWORK

The National Legal Framework governing the Benga-Dwangwa (M005 section) road project outlines various laws and regulations aimed at ensuring environmental protection, sustainable

development, and social welfare in Malawi. These laws have direct implications for both Phase I (Benga to Nkhotakota Boma) and Phase II (Nkhotakota Boma to Dwangwa) of the project, as well as their feeder roads. Here's a summary of the key legal aspects:

- **Environment Management Act (2017):** Mandates environmental assessments and mitigation measures to minimize negative impacts on the environment. The project must comply with this act to ensure sustainable environmental management.
- **Water Resources Act (2013):** Requires measures to protect water resources from pollution and depletion, which is crucial for preserving water quality along the road route.
- **The Land Act (2016):** Guides land tenure, compensation, and resettlement processes, as the project may involve land acquisition and displacement of communities.
- **Lands Acquisition Act (1979) and Lands Acquisition (Amendment) Act (2017):** Govern land acquisition procedures and compensation, particularly relevant for acquiring land for road expansion and diversions.
- **The Physical Planning Act (2016):** Regulates land use and development, ensuring orderly and sustainable infrastructure development in both rural and urban areas.
- **The Customary Land Act (2016):** Addresses management and administration of traditional land, requiring fair compensation for land use changes affecting customary landowners.
- **Forestry Act (1997) and Forest Amendment Act (2017):** Protects Forest resources and biodiversity, guiding sustainable management practices and conservation efforts along the road route.
- **National Parks and Wildlife Act (2000):** Ensures protection and sustainable management of wildlife reserves, relevant for areas like the Nkhotakota Wildlife Reserve along the road.
- **Water Works Act (1995):** Regulates water infrastructure development and pollution prevention, important for safeguarding water sources along the road route.
- **The Public Roads Act (1962) and the Public Roads Amendment Act (2017):** Establishes standards and safety measures for road construction, ensuring public safety and durability of road infrastructure.
- **The Local Government Act (1998) and the Local Government (Amendment) Act (2017):** Empowers local councils in planning and development, requiring collaboration with district authorities for waste management and infrastructure planning.
- **Occupational Safety, Health and Welfare Act (1997):** Ensures safety and welfare of workers, requiring contractors to provide safe working conditions during project implementation.

- **Public Health Act (1941):** Addresses health-related issues, necessitating the provision of sanitary facilities and waste management during construction to protect public health.
- **HIV and AIDS (Prevention and Management) Act (2018):** Mandates HIV prevention measures and management, requiring the project to implement interventions to safeguard workers' health.
- **Environment Management (Waste Management and Sanitation) Regulations (2008):** Guides waste management practices, requiring collaboration with local authorities for waste disposal.
- **Environment Management (Chemicals and Toxic Substances Management) Regulations, 2008:** Regulates handling and storage of hazardous materials, important for the safe management of chemicals used in construction.
- **Gender Equality Act (2013):** Promotes gender equality and prohibits discrimination, requiring the project to ensure equal employment opportunities for both men and women.
- **Monuments and Relics Act (1995):** Protects archaeological sites and relics, ensuring preservation of cultural heritage sites like graveyards along the road route.

4.3 RELEVANT AFRICAN DEVELOPMENT BANK SAFEGUARDS POLICIES

The African Development Bank (AfDB) safeguards policies relevant to the Benga-Dwangwa (M005 section) road project aim to ensure sustainable development, environmental conservation, and social equity across all project phases, including feeder roads. Here's a summary of the key safeguards policies:

- **Environmental and Social Assessment (OS 1):** This policy aims to integrate environmental and social considerations into project planning and implementation. The project shall conduct comprehensive assessments, implement mitigation measures, and ensure stakeholder consultation throughout all project phases, including feeder roads.
- **Involuntary Resettlement, Land Acquisition, Displacement, and Compensation (OS 2):** The objective is to ensure fair treatment and compensation for affected communities in case of displacement. The project will develop a Resettlement Action Plan (RAP), minimize displacement, provide compensation, and engage in meaningful stakeholder consultation across all project phases, including feeder roads.
- **Biodiversity, Renewable Resources, and Ecosystem Services (OS 3):** This policy aims to conserve biodiversity and promote sustainable resource use. The project will implement

measures to mitigate adverse impacts, restore ecosystems, and promote sustainable resource management across all project phases, including feeder roads.

- **Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials, and Resource Efficiency (OS 4):** The objective is to manage pollutants and promote resource efficiency. The project will implement pollution prevention measures, manage hazardous materials, and promote resource efficiency throughout all project phases, including feeder roads.
- **Labour Conditions, Health, and Safety (OS 5):** This policy aims to protect workers' rights and ensure occupational safety. The project will implement measures to ensure safe working conditions, adhere to labor standards, and enhance productivity across all project phases, including feeder roads.
- **Gender strategy of the African Development Bank:** The objective is to integrate gender considerations and promote gender equality. The project will mainstream gender into project planning and implementation, enhance capacity-building efforts, and ensure equitable participation across all project phases, including feeder roads.

5. Summary of positive and negative environmental and social impacts

The rehabilitation of the Benga – Dwangwa Road is expected to have both positive and negative impacts at the designing, construction and decommissioning stage of the project. These impacts are going to be more during the construction and decommission of the road project than during the designing phase.

Positive Impacts

- i. Increased trading activities - Improved accessibility of the road will enhance business activities along the road, in all the trading centres.
- ii. Creation of Employment opportunities – the road construction project is expected to recruit about 1410 under phase I and 1590 under phase II people mostly from the local area.
- iii. Knowledge and Skills Transfer - Employment of local people from within the projects area of impact will facilitate capacity enhancement and the acquisition of specific skill sets through on the job and formal training.
- iv. Payment of Taxes - The contractor will have to ensure fairly, honestly and timely remittance of the taxes to Government and procure services and goods from tax compliant businesses.

- v. Increased disposable income/ Improved Standards of Living - The workforce at the project site will earn significant incomes which will result in an increased disposable income.
- vi. Increased trade and marketing - The project will also be buying construction materials from the local market and will provide business for the local businesses.

Negative Impacts

- i. Clearance of vegetation - The rehabilitation of Benga – Dwangwa (M005) Road to a 7 meters carriageway and 2 metres width sealed shoulders, double lane bridges and works at borrow and quarry sites including access roads to such sites will result in clearance of some woody and shrub vegetation species.
- ii. Interference with project area rivers and streams riparian buffer zones - Many rivers and streams passes across the Benga – Dwangwa (M005) Road section. Possible impacts on the river and its riparian buffer zones can arise from siltation, clearance of vegetation, excessive water use, illicit waste disposal and alteration of natural hydrology.
- iii. Noise and vibration - Noise will be generated by the movement of construction vehicles to and from work sites and the operation of construction machinery.
- iv. Improper Waste Disposal - Different types of wastes are expected to be produced at various stages of the road project.
- v. Impacts of waste on soils - Wastes from the rehabilitation of Benga – Dwangwa (M005) road will have impacts on the soils upon which many people along the project area depend for their rice, maize, banana and fruit growing as well as grazing areas.
- vi. Impacts of waste on water quality - Rehabilitation of the road can lead to contamination of the streams, rivers and the lake. These contaminations can have a serious environmental effect on the fauna and flora along the streams and rivers.
- vii. Impact on air quality - Road construction projects have a bearing on air quality. Some of the pollution sources include emissions from construction machinery and vehicles and road paving where handling of asphalt compounds is a major concern, as it is known to be associated with certain gastrointestinal cancers among the majority of workers who have long term exposure to the compounds.
- viii. Displacement of properties, services, and agricultural lands: - The current M005 Road is characterised by road reserve encroachments especially at settlements and agricultural lands which will definitely be affected due to construction of the road. As a result, there will be a need to address both the displacement of properties and services, as well as the loss of agricultural lands within the road reserve boundary.

- ix. Increased incidence of sexually transmitted illnesses (STIs) including HIV and AIDS - Construction works normally brings along concentration of people in campsites. It may also cause an influx of migrant workers looking for employment opportunities. An influx of migrant workers can be socially disruptive force on social structure. Sexually transmitted diseases (STDs) including HIV/AIDS and other social diseases often increases in areas where construction camps are located.
- x. Impact on Community Health and Social Well-being: The potential increase in unplanned or teenage pregnancies, especially among vulnerable groups like schoolgirls and unemployed women, which could lead to detrimental effects on community health and social well-being, including school dropouts and economic strain on families and society. Mitigation strategies include establishing a Grievance Redress Mechanism and enforcing a code of conduct, implementing comprehensive sexual and reproductive health education programs, strengthening access to reproductive health services, engaging community leaders in promoting gender equality, and creating economic empowerment opportunities for young women and girls. These measures aim to raise awareness, promote responsible behavior, and empower individuals, ultimately contributing to improved community well-being
- xi. Disruption of traffic - Slow moving contractor delivery vehicles and machinery to and from the work sites will result in traffic disruption and possibly accidents. Motorists using the M005 Road will be forced to slow down or stop to give precedence to contractor vehicles and machinery. Some sections of the project road will be closed and motorists forced to use provided diversion routes. The longer the diversion the greater the delay. The delay will also be determined by the quality of the diversion roads.
- xii. Exposure Occupational health and safety - Many construction project activities pose a direct threat to the health and safety of project employees and the surrounding communities. Hazardous operations during road construction involve handling materials such as hot asphalt and fuel, operating complicated machinery, and performing various civil works
- xiii. Increased cases of Sexual Exploitation and abuse (SEA) and Gender based Violence (GBV) - Construction workers will have extra disposable income that may lead to the harassment and sometimes molestation of women in general and specifically their wives. Likewise, some women working at the project sites may harass their unemployed husbands, due to increased disposable incomes.

- xiv. Increased Covid-19 infections Cases - Influx of people during road construction may increase the number of people suffering from Covid-19 which could lead in fast spread coronavirus. People with weakened immune systems and people with conditions such as diabetes, heart and lung disease are also more vulnerable.
- xv. Destruction and alteration of the aesthetic value of the landscape - Road construction and excavation works scars the environment. It alters the aesthetic value of the landscape. This impact is more pronounced at borrow pits and quarry sites. A quarry is a type of open-pit mine from which rock or minerals are extracted.

6. Stakeholder Consultations

The stakeholder consultation process for the project followed the Environmental Impact Assessment Guidelines (1997), Environmental and Social Management Framework, and Resettlement Management Framework.

Stakeholder	Justification
Project Proponent – Roads Authority	Responsible for providing necessary project information for ESIA/RAP purposes as the client.
Ministries	Policy holders and custodians of relevant legal frameworks guiding the project's alignment with ESIA/RAP requirements. Consulted ministries include the Ministry of Gender, Community Development & Social Welfare, Ministry of Water & Sanitation, Water Resources Department – Ground Water Division, Ministry of Lands, National Water Resources Authority, and Malawi Environment Protection Authority.
Nkhotakota District Council	Responsible for monitoring and reinforcing social and environmental management plans for the project. Consulted departments within the council include the District Gender Office, District Commissioner, and Directorate of Planning & Development.
Other District Stakeholders	Stakeholders potentially impacted by the project or located in proximity to the project site. Consulted stakeholders include African Parks – Nkhotakota Wildlife Reserve, Nkhotakota Youth Code, Central Region Water Board, RIPPLE AFRICA, NAWIRA, and Nkhotakota Police Station.

Communities, Community Leaders, and Community Structures	Representatives of communities directly or indirectly affected by the project. Consulted representatives include those from Area Development Committees, village development committees, market committees, and community women, men, and youth representatives.
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Issues raised by stakeholders

This section highlights the major issues raised during stakeholder consultations and suggested enhancements/mitigations:

Table: Issues raised during initial stakeholder consultations

Stakeholder	Major Issue Raised	Suggested Enhancement / Mitigation
Park Manager, Nkhota-kota Wildlife Reserve	Soil erosion affecting fish habitats and spawning zones; Increased visibility of human community for wildlife animals	Avoid gravel extraction inside the park; Consult agriculture and fisheries departments for breeding site management; Minimize tree cutting to maintain vegetation coverage
DESC, Nkhota-kota District Council	Increased business activities; Improved transportation; Risks of HIV/AIDS transmission and GBV; Increased accidents due to speeding	Provide loan facilities for business upgrades; Implement road safety measures like humps and signs; Sensitize locals and workers on HIV/AIDS and GBV risks
Community FGD, Men	Demolition of houses and buildings; Increased compensation; Spread of HIV/AIDS and COVID-19	Compensate affected persons before works begin; Conduct sensitization campaigns; Establish a committee for compensation management
Community FGD, Women	Increased spread of HIV/AIDS and COVID-19; Disturbance of marriages and classes	Conduct HIV/AIDS and COVID-19 sensitization meetings; Monitor school children's activities
Community FGD, Market Committees	Loss of business; Boost in tourism; Increased demand for rent and food	Provide alternative trading spaces and compensation; Promote tourism investments; Monitor recruitment to ensure locals' employment

Stakeholder	Major Issue Raised	Suggested Enhancement / Mitigation
Community FGD, Youth	Increased employment opportunities; Enhancement of technology	Involve local structures in recruitment; Use updated machines for technological advancement
Department of Forestry, Deputy Director	Removal of vegetation during construction; Illegal movement of forestry resources; Erosion and siltation	Plan for tree replacement; Involve communities in forestry protection; Design drainage systems to minimize siltation
Ministry of Transport, Roads Department, Deputy Director	Single bridges' poor condition; Cargo overload; Employment opportunities; Skill transfer; Boom in businesses	Replace single bridges with double lanes; Construct weigh bridges to manage overloading; Emphasize local employment; Encourage skill transfer; Support women-owned businesses

Issues raised during follow up district stakeholder consultations

Issues Raised	Forum	Response/Recommendations
Road construction may affect NWR area, leading to human-animal conflict	KII, NAWIRA	Liaise with NWR to move animals away; Conduct community awareness
Construction contributes to deforestation and soil degradation	KII, NAWIRA	Support VNRMC's afforestation activities; Provide materials for seedlings
Handling resettlement grievances from affected communities	District Stakeholders Workshop	Set up a resettlement working group (RWG); Address all issues before construction
Barrow pits left uncovered after construction	District Stakeholders Workshop	Reinstate barrow pits immediately after use; Consider campsite arrangements
Disruption of construction due to compensation issues	KII, OC Nkhotakota Police	Address all complaints before construction

Issues Raised	Forum	Response/Recommendations
Supporting the council in reinforcing safeguards	District Stakeholders Workshop	Provide adequate support to reinforce safeguards
Afforestation interventions after cutting trees	-	Replace every tree cut with ten seedlings; Direct afforestation interventions
Removal of boreholes during construction	-	Ensure replacements or proper diversions before project start
Water supply infrastructure crossing the road	KII, CRWB Nkhotakota	Collect coordinates of infrastructure; Consult and coordinate with relevant institutions

Summary of the major issues raised during follow-up community stakeholder consultations and the proposed redress through FGDs:

Issue Raised	Proposed Redress
Death of PAP before compensation payouts	Organize proper procedures for distributing compensation; Ensure transparency in compensation distribution
Hiring laborers from within the project area	Ensure the contractor prioritizes local laborers for employment
Lack of involvement of VDCs in valuation and resettlement processes	Organize proper communication channels to involve VDCs; Cross-check property ownership with chiefs and VDCs during asset registration
Routine for compensation and re-compensation	Clarify compensation procedures and criteria; Ensure fairness in compensation distribution
Rushed valuation exercises leading to wrong information collection	Conduct proper sensitization to inform people about construction plans and property boundaries
Compensation for people without properties along the road	Verify property ownership before compensation; Ensure fairness and accuracy in compensation
Outstanding resettlement issues from previous projects	Resolve outstanding issues before commencing new project activities
Lack of community sensitization about project impacts	Conduct thorough community sensitization on both positive and negative project impacts

Unclear land limits along the road	Provide awareness through community leaders and educate community members on land boundaries
Compensation discrepancies between trees and crops	Follow proper protocol and provide accurate information to reduce conflicts
Payment of compensation using cheques instead of cash	Consider using locally available banks and issuing cheques for compensation payments
Lack of awareness about reporting resettlement complaints	Conduct prior sensitization to inform communities about complaint reporting procedures

7. Environmental and Social Monitoring Plan

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Pre-construction Phase					
Socio-economic	Creation of employment opportunities	Maximize employment of local professionals, provide equal opportunities for men and women, ensure tax remittance	RA and RFA	Planning phase	10,000,000.00
Socio-economic	Anxiety of loss of land and property	Public awareness, consultation meetings, compensation and resettlement plans	PIU/RA	Planning and Site Clearing Phase	As costed in the RAP report
Socio-economic	Anxiety of temporary loss of businesses	Sensitization, alternative business locations, compensation for temporary loss	Developer, local leaders	Planning and Site Clearing Phase	As needed
Resettlement	Loss of property due to road realignment	Resettlement Action Plan, Grievance Redress Mechanism	RA	Throughout project	As costed in the RAP report
Construction Phase					

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Socio-economic	Increased trading activities	Community sensitization, safety awareness, entrepreneurial capacity building	PIU/RA	During construction Phase	5,500,000.00
Socio-economic	Creation of employment opportunities	Local hiring, gender considerations, compliance with labor laws	Contractor	During construction Phase	15,000,000.00
Socio-economic	Knowledge and skills transfer	Local hiring, apprenticeships, on-the-job training	Contractor	During construction Phase	8,000,000.00
Socio-economic	Payment of taxes	Fair and timely tax remittance	Contractor	Throughout project	As needed
Socio-economic	Increased disposable income/Improved standards of living	Fair wages, compliance with labor laws	Contractor and consultant	Throughout project	8,000,000.00
Socio-economic	Increased trade and marketing	Timely payments, support for local businesses, tax compliance	Contractor	Throughout project	2,500,000.00

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Vegetation	Clearance of vegetation and loss of biodiversity	Selective tree removal, habitat restoration, rehabilitation of borrow pits/quarries	Contractor	Throughout project	15,000,000.00
Vegetation	Destruction and alteration of aesthetic value	Rehabilitation of borrow pits/quarries, landscaping	Contractor	During construction Phase and post-construction	2,000,000.00
Land	Loss of lands along road reserve boundary	Timing of construction, awareness meetings, compensation	RA and contractor	Preconstruction phase	10,000,000.00
Land	Impacts of land acquisition	Consultation with regulatory bodies, acquisition permits, community agreements	Contractor	Preconstruction phase	15,000,000.00
Wildlife	Interference with riparian buffer zones	Preserving natural drainage, vegetation, obtaining permits	Contractor	During construction Phase	20,000,000.00
Wildlife	Noise and vibration	Machinery servicing, daytime work.	Contractor	During construction Phase	20,000,000.00

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Waste	Improper waste management	Waste management plan, liaison with district council	Contractor	During construction Phase	20,000,000.00
Soil	Impacts on soils	Limit clearing activities, erosion control, rehabilitation	Contractor	During construction Phase	50,000,000.00
Water	Impacts on water quality	Proper storage, drainage management, waste disposal	Contractor	During construction Phase	Variable
Air	Impact on air quality	Protective equipment, pollution regulations, dust control	Contractor	During construction Phase	Variable
Social	Displacement of properties and services	Resettlement Action Plan, community education	PIU/RA	Pre-construction Phase and post-construction	As costed in the RAP report
Social	Impact on Community Health and Social Well-being.	Child protection plan, education programs	Contractor	Throughout project	16,000,000.00
Social	Increased cases of SEA and GBV	Code of conduct, reporting mechanisms, community sensitization	Contractor	During construction Phase	30,000,000.00

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Health and Safety	Disruption of traffic	Signage, designated access routes, traffic management plan	Contractor	During construction Phase	20,000,000.00
Health and Safety	Exposure Occupational health and safety	Protective equipment, supervision, warning signs	Contractor	During construction Phase	30,000,000.00
Health and Safety	Increased Covid-19 infections cases	Prevention guidelines, hygiene measures	Contractor	During construction Phase	20,000,000.00
Health and Safety	Increased incidence of STIs including HIV/AIDS	Local hiring, compliance with health initiatives, HIV/AIDS programs	Contractor	During construction Phase	25,000,000.00
Health and Safety	Interruption of access to social amenities and property	Traffic management plan, community notification	Contractor	During construction Phase	10,000,000.00
Health and Safety	Potential of child abuse/child labour	Prevention plan, worker sensitization	Contractor	During construction Phase	5,000,000.00
Health and Safety	Impacts from workers' camps	Camp location/design, community consultation	Contractor	Pre-construction phase	As needed

Environmental Component/Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible Institution	Time Frame	Estimated Cost (MK)
Social	Potential social impacts due to population/labour influx	Local hiring, orientation programs, code of conduct	Contractor	During construction Phase	3,000,000.00
Non-Compliance	Non-compliance to implementation of ESMP	Independent annual audit	PIU/RA	During construction	20,000,000.00
					400,000,000.00

8. Roles and Responsibilities

Project Client (PIU/Road Authority):

- Provide oversight of the project.
- Ensure compliance with contractual obligations and standards.
- Liaise between project entities, financiers, and the government.

Resident Engineer (Consultant):

- Supervise implementation of the Contractor's Environmental and Social Management Plan (CESMP) during construction.

Consultant ESHS Personnel (Environmental and Social Specialists):

- Issue instructions to the Contractor based on ESHS considerations.
- Monitor and verify compliance with the CESMP and Project ESIA conditions.
- Submit regular reports to the Project Client.

Contractor EHSS Policy and Responsibilities:

- Develop and implement the CESMP aligned with the ESIA.
- Provide a safe working environment.
- Encourage adoption of Environmental, Social, Health, and Safety (ESHSS) management.

Nkhotakota District Council:

- Link the Contractor to local communities.
- Mobilize communities in support of the project.
- Ensure compliance with laws, CESMP, and related ESHS requirements.
- Report noncompliance related to ESHS laws and policies.

Nkhotakota District Communities:

- Participate in project implementation as workers.
- Adhere to contractor guidelines for safety.
- Communicate concerns to the contractor.
- Participate in public consultations and training.
- Participate in grievance redress committees.

Gender-based Violence (GBV) and Harassment (GBVH), Sexual Exploitation and Abuse (SEA), and Child Protection Service Providers:

- Implement, monitor, and report issues related to GBVH, SEA, and child labor.

COVID-19 and HIV&AIDS Prevention Service Provider:

- Provide COVID-19 and HIV/AIDS prevention services to project employees and the community.
- Develop detailed prevention plans for both COVID-19 and HIV&AIDS.

Total cost for the full implementation of Environmental and Social

Item	Description	Total Cost (MWK)	Total Cost (USD)
1	Enviromental and Social Management Plan	400,000, 000.00	484, 000.00
2	Environmental and Social monitoring Plan	1,089,500,000.00	1, 318, 295.00
3	Stakeholders Engagement Cost	110, 000, 000.00	133, 100.00
TOTAL		1,599, 500, 000 .00	1, 935, 395.00

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List of Acronyms and Abbreviations

AAS	Atomic Absorption Spectrometry
ADC	Area Development Committees
ADMARC.	Agricultural Development and Marketing Corporation
AEDCs	Agricultural Extension Development Coordinator
AIDS	Acquired Immune Deficiency Syndrome
AP	African Parks.
APHA	American Public Health Association
ARAP	Abbreviated Resettlement Action Plan
ARI	Acute Respiratory Infection
BOD	Biochemical Oxygen Demand
BVC	Beach Village Committee
CARs	Corrective Action Requests
CCLM	Community Child Labour Monitors
CEO	Chief Executive Officer
CESMP	Contractors Environmental and Social Management Plan
CGRMC	Community Grievance Redress Management Committee
CHAG	Community Health Action Groups
CHAM	Christian Health Association of Malawi
COD,	Chemical Oxygen Demand
COVID 19	Coronavirus Disease
CPF	Community Policing Forums
CPUE	Catch Per Unit Effort
CRWB	Central Region Water Board
DC	District Commissioner
DCLC	District Child Labour Committee
DEHO	District Environmental Health Officer
DESC	District Environment Subcommittee
DHO	District Health Officer
PPPs	Public-Private Partnerships
EAD	Environmental Affairs Department

EDO	Environmental District Officer
EMA	Environmental Management Act
EPA	Extension Planning Areas
ESHS	Environmental Social Health and Safety
ESIA	Environmental and Social Impact Assessment
ESMPs	Environmental and Social Management Plans
FGDs	Focus Group Discussions
GBV	Gender Based Violence
GHGs	Green House Gases
GoM	Government of Malawi
GPS	Geographical Positioning System
GRM	Grievance Redress Mechanism
GVH's	Group Village Headman
HIV	Human Immunodeficiency Virus
IBA	International Bird Area
ICT	Information and Communication Technologies
IEC	Information, Education and Communication
INNORET	Innovation, Research and Training Centre
ISS	Integrated Safeguards System
IUCN	International Union for Conservation Of Nature
KIIs	Key Informant Interviews
MCP	Malawi Congress Party
MDGs	Millennium Development Goals
MEPA	Malawi Environment Protection Authority
MGDS	Malawi Growth Development Strategy
MK	Malawi Kwacha
MRA	Malawi Revenue Authority
MRTTP	The Malawi Rural Travel And Transport Programme
MS	Malawi Standards
MSIPs	Management Strategies and Implementation plans
NCIC	National Construction Industry Council
NEP	National Environmental Policy

NGOs	Non-Governmental Organisations
NSO	National Statistical Office
NSO	National Statistical Office
NWIRA	Nkhotakota Wildlife Reserve Association
NWR	Nkhotakota Wildlife Reserve
NWRA	National Water Resources Authority
OPD	Outpatient Department
OS	Operational Safeguards
OSHAWA	Occupational Safety, Health And Welfare Act
PAPs	Project Affected People
PAYE	Pay As You Earn
PPDA	The Public Procurement And Asset Disposal Authority
PPE	Personal Protective Equipment
PTA	Parent Teacher Association
PWD	People With Disabilities
RA	Roads Authority
RAP	Resettlement Action Plan
ROW	Right of Way
SEA	Sexual Exploitation And Abuse
SEP	Socio-Economic Profile
SMEs	Small And Medium Scale Businesses
STDs	Sexually Transmitted Diseases
TC	Trading Center
TCE	Technical Committee On The Environment
ToRs	Terms Of Reference
UNEP	United Nations Environment Programme
UNESCO	The United Nations Educational, Scientific And Cultural Organisation
US	The United States
VAC	Village Agriculture Committee
VDCs	Village Development Committees
VNRMC	Village Natural Resources Management Committee
VSL	Village Savings And Loans

WHO	World Health Organization
WQS	Water Quality Status
DBST	bituminous surface treatment

CHAPTER ONE: INTRODUCTION

1.1. Background Information

The policy of the Government of Malawi (GoM) towards the roads sub-sector is to build, maintain and ensure efficient utilisation of the road infrastructure and other services appropriate to meet the current and future development needs of the economy. The M005 Road is one of the primary overland transportation corridors in Malawi. The road is a vital artery for trade, agriculture, and community connectivity, has significantly deteriorated over time due to increased traffic, climatic variations, and limited maintenance. This deterioration has led to safety concerns and impeded economic growth in the central and northern regions of the country. Despite the efforts involving periodic maintenance and minor upgrades, the road remains inadequate to meet the long-term needs and challenges it faces. Its current condition, characterized by worn surfaces, inadequate drainage systems, and single-lane bridges, underscores the urgency for a comprehensive upgrade.

In response to these challenges, the Government of Malawi, through the Roads Authority (RA) and with financial support from the African Development Bank (AfDB), has initiated a major endeavor to rehabilitate and upgrade the M005 road section from Benga to Dwangwa in Nkhosha District. The detailed engineering design for this road section, completed in 2013, encompasses the Kaphatenga to Dwangwa road segment, with the Benga to Dwangwa stretch spanning approximately 100 kilometers. Additionally, the project includes improvements to associated feeder roads in the area. The proposed implementation of this project is divided into two phases. Phase one of the project runs from Benga to Nkhosha Boma with approximately 47km and Phase two of the project runs from Nkhosha-Kota Boma to Dwangwa trading Centre with approximately 53km. The ESIA study combines both phases design and type of machinery and structures to be constructed. Phase two shall be implemented at a later stage.

The project involves the comprehensive rehabilitation and widening of the carriageway from Benga Catholic Parish to Dwangwa Trading Centre, with an estimated budget of approximately MWK 187,776,000,000 (USD 111.55 million). It will be executed in two

phases: Phase I covers the rehabilitation from Benga to Nkhotakota Boma, while Phase II extends from Nkhotakota Boma to Dwangwa Trading Centre.

Phase I encompasses the rehabilitation and upgrading of 47 kilometers of the M005 road and associated feeder roads, with feeder roads including Kalimanjira to Chididi Health Centre, Rajabu to Makuzi, Mwansambo Turnoff to Kayoyo, Nkhotakota Prison to 4ways, 4 Ways to Nkhufi road, Nkhufi road to Nkhotakota LEA School, M18 Bishop Road to M005, Nkhotakota LEA School to Nkhotakota Police Station, and Mount Meru filling Station to Airport with an allocated budget of approximately MWK 87,976,000,000 (USD 52.28 million). Phase II involves the rehabilitation and upgrading of the remaining 53 kilometers of the M005 road from Nkhotakota Boma to Dwangwa, along with associated feeder roads including Kaombe to Roadblock to Mphangano and Nsenjere Turnoff to Nsenjere with an allocated budget of around MWK 99,800,000,000 (USD 59.27 million).

The major works of the project entail the rehabilitation and widening of the carriageway from Benga Catholic Parish to Dwangwa Trading Centre, aiming to address the road's current deficiencies comprehensively. It's worth noting that the project also encompasses improvements to feeder roads in the project area.

Given the scope and nature of the construction works and their potential impacts on the bio-physical and socio-economic environment, the project has received an environmental classification of Category A. This classification mandates the conduct of an Environmental and Social Impact Assessment (ESIA) study in accordance with the Environmental Management Act (2017), Environmental Social Impact Assessment Guidelines (1997), AfDB Safeguards policies, and the Roads Authority's Malawi Environmental and Social Management Guidelines for the Road Sector. The ESIA study will identify, analyze, and propose mitigation measures for the environmental and social impacts of the road project, including its feeder roads.

1.2. Contact Details of the Project Proponent

Government of Malawi through the Roads Authority awarded a contract to Kandoli Consulting Engineers/ AES JV to review and update the ESIA for the rehabilitation of M005

Road from Benga to Dwangwa. Details of the postal and physical address for Roads Authority are as follows:

Proponent Name : Roads Authority
Contact Person : The Chief Executive Officer
Physical Address : Functional Building, Off Paul Kagame Road, Lilongwe
Postal Address : Private Bag B346, Lilongwe3
Cell Phone : (265) 1 753 699
Fax : (265) 01 750 307
Email : ra@ra.org.mw

1.3. Aim of the Study

The primary aim of updating the ESIA for the Benga-Dwangwa Road Project is to comprehensively address any environmental and socio-economic changes that have transpired since the initial assessment, including the impacts associated with the additional works, specifically the rehabilitation of feeder roads. Given the passage of significant time prior to the commencement of construction activities, this update is crucial to ensure that the report accurately reflects the current context and conditions.

Specific objectives of the updated study include:

- i. Incorporating Recent Changes: To update the ESIA with the latest data and information, capturing any notable changes in the social, economic, biological, and environmental aspects of the project area, including the rehabilitation of feeder roads. This entails reassessing baseline conditions and re-evaluating potential impacts based on the current scenario and project phases.
- ii. Focused Analysis on Anticipated Changes: To concentrate on anticipated changes in the project's surroundings since the original ESIA, including shifts in demographic dynamics, economic activities, natural habitats, and overall environmental conditions that could impact the project, including the feeder road rehabilitation.
- iii. Revising Mitigation and Management Measures: Based on the updated assessment, the study will revisit and potentially revise proposed mitigation and management strategies, considering the impacts of both the main road project and feeder road

rehabilitation. This ensures that environmental and social management plans remain relevant and effective under the prevailing conditions and project phases.

- iv. **Ensuring Compliance and Alignment:** To guarantee that the updated ESIA remains compliant with national and international environmental and social standards, particularly those established by the AfDB, while considering the rehabilitation of feeder roads. Additionally, the study seeks to align the project with evolving developmental goals and policies, especially considering the strategic objectives outlined in Malawi Vision 2063

1.4. Location and Site

The Benga-Dwangwa (M005 section) project is divided into two distinct phases, each with its own geographical scope and associated feeder roads. Phase I encompasses the stretch from Benga to Nkhotakota Boma, covering a distance of 47 kilometers. This phase traverses through Traditional Authorities (TAs) Mwadzama, Nkhanga, and Kalimanjira in Nkhotakota district. Benga, situated approximately 150 km northeast of Lilongwe, serves as the starting point for this phase. Positioned 10 km east of Lake Malawi and 30 km west of the Ntchisi Forest Reserve, Benga is strategically located along the M005 road connecting Salima and Nkhotakota Township. The endpoint of Phase I is Nkhotakota Boma, situated approximately 200 km northeast of Lilongwe and 100 km north of Salima Township. Its geographical coordinates are 13° 22' 0" South, 34° 17' 0" East. Please refer to **Figures 1 and 2** for a map depicting the project's location.

Currently, the riding surface of the road in Phase I ranges from fair to poor conditions, with certain sections still in good condition due to extensive routine maintenance programs carried out annually. Additionally, Phase I includes nine feeder roads, each serving specific areas and communities along the route. These feeder roads, totaling nine in number, include connections to health centers, schools, police stations, and residential areas, enhancing local accessibility and connectivity.

Phase II of the project covers the road section from Nkhotakota Boma to Dwangwa Trading Centre (TC). This segment spans Traditional Authorities Malengachanzi, Mphonde, and Kanyenda in Nkhotakota district. Dwangwa, situated around 55 km north of

Nkhotakota Township/Boma, serves as the endpoint for Phase II with geographical coordinates of 12° 34' 0" South, 34° 9' 0" East. Feeder roads under Phase II include connections to various settlements and areas of significance, facilitating local mobility and access to essential services.

This topographic map depicts the Malawi-Lesotho border area. The M18 road is shown as a prominent red line, starting from the north and running southwards. To the east of the road is Lake Malawi. The map includes numerous place names such as Lilongwe, Mwanambao, Kengha, and Khotakota. It also shows various rivers and streams, including the Shire River and the Lilongwe River. The map is overlaid with a grid of latitude and longitude coordinates, with latitude ranging from 8527500 to 8565000 and longitude from 622500 to 652500.



PHASE TWO PROJECT LOCATION MAP - NKHOTAKOTA TO DWANGWA

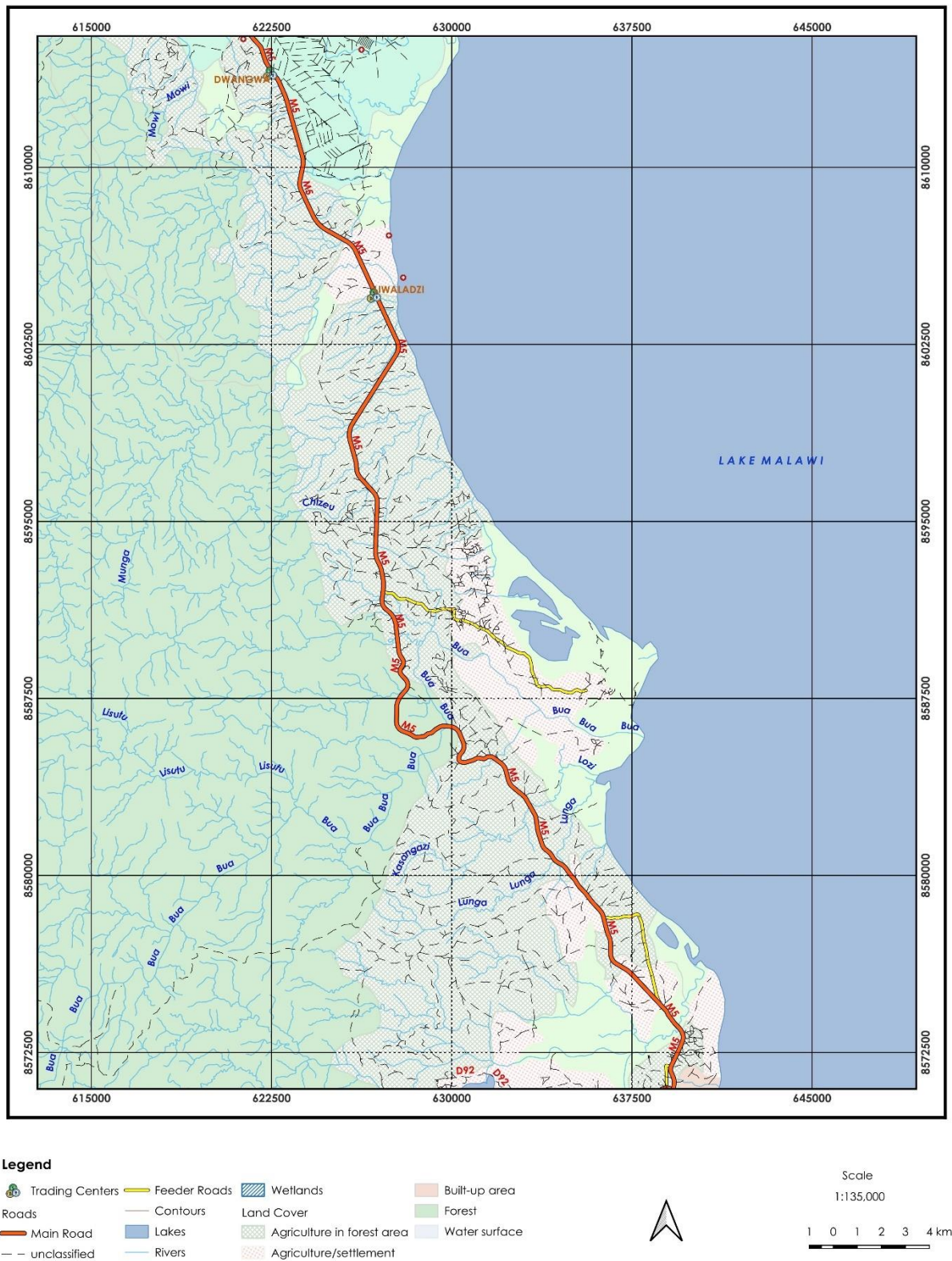


Figure 2 .Phase Two Project location Map

1.5. Justification/Rationale for the ESIA.

The necessity of conducting an ESIA for the Benga-Dwangwa Road Project is underscored by several critical factors. This section highlights the importance of a thorough ESIA in guiding sustainable decision-making and developing effective mitigation strategies for the road upgrade project.

- i. **Identifying Potential Impacts:** The project, involving the upgrade and rehabilitation of a major road, is likely to have significant environmental and social impacts. These may include alterations to natural habitats, effects on local wildlife, potential displacement of communities, changes in land use, and impacts on local air and water quality. An ESIA is essential to identify, predict, and assess these potential impacts systematically.
- ii. **Guiding Sustainable Development:** The ESIA serves as a fundamental tool in ensuring that the project aligns with sustainable development principles. It helps in balancing the infrastructural benefits with environmental preservation and social well-being. The assessment will provide insights into how the project can contribute to Malawi's economic growth while minimizing adverse environmental and social effects.
- iii. **Facilitating Stakeholder Engagement:** Conducting an ESIA is crucial for effective stakeholder engagement. It creates a platform for involving local communities, government agencies, and other stakeholders in the project planning process. This engagement is vital for understanding stakeholder concerns, expectations, and suggestions, which can be incorporated into the project design.
- iv. **Ensuring Legal and Policy Compliance:** The ESIA is a regulatory requirement, ensuring compliance with national environmental laws and international standards, including those stipulated by the AfDB. This compliance is not just a legal obligation but also a commitment to upholding high environmental and social standards.
- v. **Developing Mitigation and Management Strategies:** The ESIA provides a basis for developing and implementing effective mitigation measures to address identified impacts. These strategies are crucial for minimizing negative consequences and enhancing positive outcomes, ensuring the project's long-term sustainability and acceptance.

1.6. Potential Users of the ESIA

The ESIA report has been prepared for use by key stakeholders to be involved in the implementation, management and monitoring of the facility as listed in Table 1.

Table - 1 Institutions to be involved in the project

NO	INSTITUTION	EXPECTED ROLES AND RESPONSIBILITIES
1	Roads Authority	Implementation, management and monitoring.
2	Contractor.	Implementation and management of ESMP.
3	Malawi Environment Protection Authority (MEPA).	<ul style="list-style-type: none"> • Oversight institution in Environment Management, Enforcement and Monitoring • Managing environmental compliance construction activities and monitoring implementation of mitigation measures. • Air pollution license. • Waste license. • Borrow pit permits. • Hazardous waste Permit.
4	Ministry of Lands.	<ul style="list-style-type: none"> • Land Expropriation.
5	Ministry of Health.	<ul style="list-style-type: none"> • Reduce exposure of workers from occupational and health and safety risks arising from construction activities.
6	Water Resources Officer National Water Resource Authority.	<ul style="list-style-type: none"> • Provision of Water Abstraction and Use. • Effluent discharge Consent.
7	Department of Physical Planning	<ul style="list-style-type: none"> • Development planning and Control.
8	Department of Forest.	<ul style="list-style-type: none"> • Tree planting and natural regeneration.
9	Ministry of Transport- Road department.	<ul style="list-style-type: none"> • Providing policy guidance on matters relating to Transport infrastructure.
10	Gender department	<ul style="list-style-type: none"> • Management and enforcement of gender related Issues.

NO	INSTITUTION	EXPECTED ROLES AND RESPONSIBILITIES
11	Roads Authority.	<ul style="list-style-type: none"> Responsible for Construction, Upgrading and Maintenance of the Road Infrastructure Malawi. Monitoring of Environmental and Safety Compliance in road Construction.
12	Ministry of Labour.	<ul style="list-style-type: none"> Work Permit, Monitoring of Labour working conditions and other employment issues.
13	Department of Mines and Ministry of Natural Resources Energy and Mining.	<ul style="list-style-type: none"> It is a requirement to obtain a licence issued by the Department of Mines for operation quarry area.
14	African Development Bank (AfDB).	<ul style="list-style-type: none"> Providing financial support and oversight for the project.
15	Nkhotakota District Councils.	<ul style="list-style-type: none"> Development Control Permit.

During the preparation of the ESIA report for the road project, these major institutions and/or their documents were consulted for their technical advice, expert knowledge and concerns or future programs as related to the project.

1.7. Methodology for Conducting the Assessment

The approach and methodology for carrying out this assignment is informed by the consulting team's understanding of the Terms of Reference (ToRs) provided in *Annex 1*. The consulting team used various approaches and techniques including use of secondary sources of data through review various relevant documents related to road construction projects. As prescribed by the Guidelines for Environmental and Social Impact Assessment (ESIA) in Malawi (1997), the team conducted stakeholder consultations in all the trading centres and selected villages along the road.

In addition, the ESIA team conducted consultations with traditional leaders and government officials at Nkhotakota District Council. The assessment of potential environmental and social impacts resulting from project-related activities were carried out

in accordance with EMA 2017, primarily focusing on identifying associated environmental and social impacts and proposing effective mitigation measures for addressing potential negative impacts. To achieve these goals, various data collection tools were used and these include: interviews, focus group discussions, desk studies, and transect walk.

The rationale for this multi-pronged approach is to solicit wide ranging data necessary for reviewing and updating of the 2022 Environmental and Social Impact Assessment for the rehabilitation of the road from Benga to Dwangwa.

The study covered the physical extent of the project site and its environs and generally followed the five steps listed below:

- ✓ Re-scoping for environmental and social Issues;
- ✓ Review of existing literature/desk studies; including the 2022 Environmental and Social Impact Assessment (ESIA);
- ✓ Physical inspection of the project site and surrounding areas;
- ✓ Socio-economic and gender assessment;
- ✓ Stakeholder consultations; and
- ✓ Reporting and documentation.

1.7.1. Re-scoping for environmental and social Issues

The period during which the initial ESIA was conducted is relatively recent (2022), and the aim of the update is to incorporate additional works that were not initially included under Phase 1 and Phase 2 of the project. Specifically, the objective of the ESIA update is to assess the impacts of rehabilitating feeder roads, which were not previously addressed. The revision in the ESIA will focus on incorporating any anticipated environmental and social impacts associated with the rehabilitation of feeder roads, ensuring comprehensive coverage of all aspects related to the project's development

In addition, the ESIA study for the proposed project was carried out in accordance with the Terms of Reference that were provided by the Roads Authority as provided in Annex 1 and in accordance with EMA (2017), using a methodology framework developed based on internationally accepted practice, and the professional experience of the study team.

This approach has satisfied requirements for Environmental and Social Management Plan as stipulated in the Guidelines for Environmental Impact Assessment of 1997, and public consultation have also been conducted as part of the assessment. The EMA (2017) requires that no licensing authority issues any license for a project for which an ESIA is required unless the Director General for MEPA has given consent to proceed due to completion and approval of a satisfactory ESIA report or due to non- requirement of an ESIA. Therefore, this report will also be submitted to the Director General for MEPA by the client (RA) for necessary approvals.

1.7.2. Review of Existing Literature.

Other existing literature, documents and data related to the project were reviewed prior to mobilization for field surveys. Documents reviewed include environmental profiles, previous environmental and social impact assessment reports of similar projects, topographical maps, national environmental and social related policies and pieces of legislation. Key reports, policies and legislations that were reviewed include the Constitution of the Republic of Malawi of 1995, the National Environmental Policy (NEP) of 2004, the Environment Management Act (EMA) of 2017, the National Forestry Policy of 2016, the National Forestry Act of 2017, the Water Resources Act of 2013, the National Land Policy of 2002, the National Land Act of 2016, the Public Health Act of 1941, Occupational Safety, Health and Welfare Act of 1997, the Water Resources Policy 2005, Malawi Vision 2063, the Resettlement Management Framework, Environmental and Social Management Framework, Environmental Impact Assessment Guidelines (1997), and many others.

In line with the review of policies and legislations and other relevant documents, the team paid particular attention to the various licences that the proposed project would require including (i) Waste and Hazardous Waste Licenses in accordance with the EMA 2017; (ii) a license to handle, store, transport or destroy waste arising from the road construction activities and the campsites; (iii) Development permission from the Nkhotakota District Council Planning Committees in accordance with section 13 (2) of the Land Act 2016; (iv) a license from the Forestry Department under the Forestry Act for the developer to enter a protected area (a Forestry Reserve) where he will cut down trees to pave way for the

road; and (v) Water Right for water abstraction for use on the road construction activities to be obtained under the Water Resources Act.

In addition to reviewing various policies, legislation, and environmental assessments, the ESIA team also conducted a thorough review of project documents related to the SADC Sub-Regional Transport and Trade Facilitation Project. These documents provide valuable insights into the broader regional context and the objectives of the project, including its potential impacts and benefits. By examining these project documents, the ESIA team gained a deeper understanding of how the Benga-Dwangwa Road Rehabilitation Project aligns with regional development goals and transportation strategies outlined by the Southern African Development Community (SADC).

Furthermore, the review of project documents allowed the ESIA team to identify any specific requirements or guidelines set forth by regional authorities or international organizations involved in the SADC Sub-Regional Transport and Trade Facilitation Project. This knowledge informed the development of the ESIA report and ensured that the assessment adequately addresses regional priorities and concerns. Additionally, insights gleaned from the review of project documents helped the ESIA team to assess potential synergies or conflicts between the Benga-Dwangwa Road Rehabilitation Project and other regional infrastructure initiatives, enabling a more comprehensive evaluation of the project's social, economic, and environmental implication.

The review of relevant documents also informed the development of ESIA report and assisted the team to have a thorough understanding of the social, economic and environmental situation of the project in relation to the national and regional situation.

1.7.3. Physical Inspection of the Site and Surrounding Areas

The consultant undertook site investigations to the proposed project site in November and December, 2023 in order to acquaint themselves with the setup of the project site, identify, analyse and assess the potential negative and positive impacts that will be brought about by the project. This involved a thorough physical examination of the project area to identify and assess potential environmental and social impacts. The inspection was key to

understanding the current condition of the site, including its topography, ecological features, and any existing infrastructure. It allowed the ESIA team to observe first-hand any areas of concern, validate data gathered from other sources, and better anticipate the project's potential effects on the local environment and communities. This step was crucial for ensuring that the ESIA is grounded in the actual conditions of the project site.

This stage also involved comprehensive on-site surveys to gather primary data crucial for the ESIA. The surveys focused on various aspects including biological diversity, water and soil quality, and socio-economic conditions (Figure 3). These surveys helped in understanding the existing environmental baseline and potential impacts of the project. They also aid in identifying any significant changes since the previous assessment. This involved establishment of any changes that may have occurred in the biophysical properties of the area include soils, flora, fauna, vegetation cover, geological features, climate, and hydrological aspects of the area.



Figure 3. Showing field surveys

1.7.4. Socio-economic and gender assessment

This stage was conducted between 26th November and 08th December, 2023 which involved building a localized socio-economic profile of the communities and existing gender disparities within the project area. Key components of the socio-economic profile include poverty status, sources and distribution of income, functionality of social structures, and accessibility of social services. Gender assessment highlights the differences between and among women, men, girls and boys in terms of their relative distribution of resources, opportunities, constraints and power in the context of the impacts that may result from

the proposed project. Participatory rural appraisal tools were used including wealth ranking, gender analysis framework and ten-seed technic.

1.7.5. Stakeholder Consultations

Stakeholder consultations for the project were conducted between 26th November and 8th December, 2023, in accordance with the Environmental Impact Assessment Guidelines (1997), Environmental and Social Management Framework, and the Resettlement Management Framework. The aim was to ensure that all stakeholders, particularly communities within the project area, were given the opportunity to provide their input on the project. Specially designed stakeholder consultation data collection tools (checklists) were developed and utilized during this process. In addition to national-level consultations in Lilongwe, stakeholder meetings and interviews were conducted at both district and community levels, engaging various stakeholders including the Nkhosakota District Council, traditional leaders, villagers in the project area, business owners at trading centers, and other relevant stakeholders.

The stakeholder consultation process involved a variety of methods, including Key Informant Interviews (KIIs), Focus Group Discussions (FGDs) as seen in *Figure 4*, and individual interviews, with a focus on ensuring representation from both male and female participants. The breakdown of consultations is as follows:

- **National consultations:** 8 KIIs were conducted, involving 6 male and 2 female participants.
- **District Consultations:** 9 KIIs and 2 FGDs were conducted, engaging a total of 21 male and 9 female participants.
- **Community Consultations:** A total of 17 FGDs were held, involving 112 male and 66 female participants.

Figure 4. District consultation meeting with District Environment Subcommittee (DESC)

Figure 5. FGD with one of the community leaders

The stakeholder mapping process was informed by the re-scoping and literature review stages, identifying key stakeholders to be consulted during the data collection process. These consultations served to gather stakeholders' perspectives on the potential physical and socioeconomic impacts of the project, as well as to solicit suggestions for mitigation and enhancement measures, and explore possible alternative solutions. Furthermore, relevant baseline data for the project area was collected from corresponding stakeholders. Key informant interviews and focus group discussions were instrumental in engaging with various stakeholders effectively.

1.7.6. Data analysis and report submission

This stage involved a systematic analysis of all data collected during the ESIA process. The analysis focuses on identifying, quantifying, and assessing the potential environmental and social impacts of the project. Key findings, along with stakeholder feedback, are incorporated to ensure a comprehensive understanding of the project's implications. After analysing the data, a draft of the updated ESIA was prepared and submitted to the Roads Authority for review. The Authority's feedback is then integrated into the final draft, which is subsequently presented to AfDB. This process ensures that the ESIA is comprehensive and aligns with the requirements and insights of the AfDB, facilitating informed decision-making for the project.

CHAPTER TWO: PROJECT DESCRIPTION AND JUSTIFICATION.

2.1. Nature of the project

The Benga-Dwangwa (M005 section) 100km road project falls under the infrastructure category and is classified as Category A according to the Government of Malawi Environmental Guidelines, mandating an Environmental and Social Impact Assessment (ESIA). The project aims to rehabilitate and upgrade the M005 road section from Benga to Dwangwa, spanning approximately 100 kilometers. Additionally, eleven feeder roads connected to the M005 are earmarked for upgrades. In general, the scope of works on the feeder roads involves hand reshaping, gravelling, and cross and longitudinal drainage upgrades. The project implementation is divided into two phases to efficiently manage the rehabilitation and upgrading process. Implementation of the project has been split into two phases as described below;

The project is situated within Traditional Authorities (TAs) Mwadzama, Nkhanga, Kalimanjira, Malengachanzi, Mphonde, and Kanyenda in Nkhotakota district, located 200 kilometers northwest of Lilongwe, the capital city of Malawi. The Benga-Dwangwa Road (M005 section) forms part of the lakeshore road network, serving as a crucial north-south link through the central region along the lakeshore.

2.1.1 Phase One

The first phase will involve rehabilitation and upgrading of 47 kilometers of the M005 road and associated feeder roads from Benga to Nkhotakota Boma. Feeder roads within this phase include;

1. Kalimanjira (M005) to Chididi Health Centre (1.3Km) and Rajabu to Makuzi (6km)
2. Mwansambo Turnoff (M005) to Kayoyo (9.7km)
3. Nkhotakota Prison (M18) to 4ways (M005) (2Km)
4. 4 Ways (M005) to Nkhufi road (M18) (3Km)
5. Nkhufi road (M18) to Nkhotakota LEA School (M005) (1.8Km)
6. M18 Bishop Road to M005 (1.0 Km)
7. Nkhotakota LEA School (M005) to Nkhotakota Police Station M18 (0.8Km)
8. Nkhotakota LEA School (M005) to Nkhotakota Police Station (M18) (0.6Km)

9. Mount Meru filling Station (M18) to Airport (M005) (0.8km)

The civil works inventory for the feeder roads in phase I of the project is summarized in **Table 2** below:

Table 2. Summary of Civil Works Inventory for Feeder Roads in Phase I

Mwansambo Turnoff (M005) to Kayoyo (9.7km)		
Chainage	Work Item	Description
0+00,0+100,0+300	Culvert	New installation
0+700	Culvert	New installation
1+100 to 2+100	Reshaping/Gravelling/ drainage	
1+300, 1+400	Culvert	Cleaning 2 culverts
2+200 - 4+400	Reshaping/Gravelling/ drainage	
2+800,3+700,4+200	Culvert	New installation
4+400 - 4+800	Grading	Mechanised grading
4+800 - 5+400	Gravelling	
5+400 - 5+800	Grading	Mechanised grading
5+800 - 6+200	Gravelling	
6+000	Culvert	New installation
6+200 - 6+700	Hand reshaping	
6+700 - 8+000	Hand reshaping/ Gravelling	
7+500	Culvert	New installation
8+000 - 8+700	Hand reshaping	
8+700 - 9+00	Gravelling	
9+000 - 9+700	Hand reshaping	
Kalimanjira (M005) to Chididi Health Centre (1.3Km) and Rajabu to Makuzi (6km)		
Chainage	Work Item	Description
0+000 - 0+300	Hand reshaping/gravelling/ drainage	
0+600, 1+300	Culvert	New installation
Rajabu to Makuzi (6km)		
0+000 @ Rajabu	Culvert	New installation
0+100	Culvert	New installation

0+300, 1+000	Culvert	New installation
1+200 - 1+400	Hand reshaping/concrete pad/check dam	
1+700	Culvert	New installation
2+300	Chamalala Bridge that is to be retained	
2+300 - 2+500	Hand reshaping / longitudinal drainage	
2+500	Culvert	New installation
2+600	2 Culverts	New installation
2+700	2 Culverts	New installation
2+500 - 2+900	Spot gravelling	
3+200	Kanamaingwe Bridge that is to be retained	
3+500,3+600,3+700	Culvert	New installation
3+800, 4+200	Culvert	New installation
4+300	Junction to Kalimanjira Turn off (M005)	
4+300	Culvert	New installation
4+500	Chididi Bridge that is to be retained	
4+800,4+900,5+000	Culvert	New installation
5+300, 5+600	Culvert	New installation
6+000	Makuzi Junction at M005	
<ul style="list-style-type: none"> • Nkhotakota Prison (M18) to 4ways (M005) (2Km) • 4 Ways (M005) to Nkhufi road (M18) (3Km) • Nkhufi road (M18) to Nkhotakota LEA School (M005) (1.8Km) • M18 Bishop Road to M005 (1.0 Km) • Nkhotakota LEA School (M005) to Nkhotakota Police Station M18 (0.8Km) • Nkhotakota LEA School (M005) to Nkhotakota Police Station (M18) (0.6Km) • Mount Meru filling Station (M18) to Airport (M005) (0.8km) 		
<p>The feeder roads listed above are located in the Nkhotakota district. The scope of works for the rehabilitation of these roads includes hand reshaping, gravelling, culvert cleaning, concrete pads, check dams, longitudinal drainage, and cross drainage (Culvert installation).</p>		

2.1.2 Phase Two

Phase two involves the rehabilitation and upgrading of the remaining 53 kilometers of the M005 road from Nkhotakota Boma to Dwangwa, along with associated feeder roads including;

1. Kaombe to Roadblock (M005) to Mphangano (5.7km)
2. Nsenjere Turnoff (M005) to Nsenjere (8Km)

The civil works inventory for the feeder roads in phase II of the project is summarily presented in **Table 3** below;

Table 3. Summary of Civil Works Inventory for Feeder Roads in Phase II

Nsenjere Turnoff (M005) to Nsenjere (8Km)		
Chainage	Work Item	Description
0+00 - 0+800	Gravelling / Reshaping	
0+500	Culvert	New installation
0+800 - 1+100	Reshaping / Gravelling	
1+400	Culvert	New installation
1+400 - 1+800	Reshaping / Gravelling	
2+300	Mbambale Bridge that is to be retained	
2+600 – 3+000	Reshaping / Gravelling / check dams	
2+600	Culvert	New installation
3+100	Culvert	New installation
3+600 - 4+200	Gravelling and associated drainage works	
4+000 - 4+200	Check dams/ lined drains	
4+200, 4+400	Culvert	New installation
4+200 - 4+700	Gravelling / check dams	
5+600 - 5+800	Reshaping / Gravelling	
5+700 - 5+900	Culvert	New installation
6+100 - 6+700	Gravelling and associated drainage works	
6+600,7+000,7+200	Culvert	New installation
7+100 - 7+200	Gravelling and associated drainage works	
7+400, 7+500	Culvert	New installation

7+700,7+800	Culvert	New installation
7+700 - 7+900	Gravelling and associated drainage works	
8+000 - 8+200	Gravelling and associated drainage works	
8+100	Culvert	New installation
8+300 - 10+500	Hand reshaping / gravelling and associated Drainage works	
Kaombe to Roadblock (M005) to Mphangano (5.7km)		
Chainage	Work Item	Description
0+000 - 1+300	Hand reshaping / gravelling and associated Drainage works	
1+300 – 1+900	Reshaping / gravelling (Swampy area)	
1+400,1+600,1+700	Culvert	New installation
1+900,2+000	Culvert	New installation
2+100 - 2+500	Reshaping / gravelling (Swampy area)	
2+200,2+300,2+500	Culvert	New installation
2+600,2+700,2+800	Culvert	New installation
3+100,3+300,3+600	Culvert	New installation
3+800,3+850,4+300	Culvert	New installation
4+700,5+000	Culvert (Chanthomba Primary School)	New installation
5+000 – 5+700	Hand reshaping / gravelling and associated Drainage works	

2.1.3 M005 Rehabilitation

The comprehensive rehabilitation of the M005 road spanning 100 kilometers aims to address its strategic importance and long-standing issues. Phase One focuses on upgrading a 47-kilometer section from Benga to Nkhotakota Boma, while Phase Two extends the rehabilitation efforts from Nkhotakota Boma to Dwangwa, covering an additional 53 kilometers. Within these phases, the scope of work involves the refurbishment and reconstruction of road sections, bridges, culverts, and longitudinal drainage systems, aiming to significantly enhance the road's functionality and durability.

2.1.3.1 Bridge Upgrades:

The Benga to Dwangwa road rehabilitation project involves upgrading a total of 20 bridges along its route. These bridges are categorized into two phases based on their replacement or retention. In Phase I, five new bridges will be constructed, namely Chamakuwi, Kanjamwana, Ling'ona, Mnchandire, and Saliwona, with 1 bridge (Chia) being retained. Phase II, on the other hand, will see the construction of eleven new bridges, including Chamachete, Chizeu, Kaombe, Kasangazi, Khako, Lunga, Mikongwe, Misenjere, Navunde, Tipati, and Walemera, while Bua, Dwangwa, and Liwaladzi will be retained. This phased approach ensures that critical bridge upgrades are efficiently managed, with new bridges being constructed in both phases to enhance the road's safety and capacity while minimizing disruptions to transportation networks.

The primary objective of these upgrades is to replace the outdated and narrow single-lane bridges with new, wider, and double-lane bridges capable of accommodating increased traffic volumes and larger vehicles. Each bridge serves as a vital link in the regional transportation network, and a detailed assessment was conducted to determine the necessity of replacement or retention. By strategically replacing or retaining bridges in each phase, the project aims to ensure the road's safety and efficiency, contributing to improved connectivity and economic growth in the region.

2.1.3.2 Retained Bridges:

While the majority of the bridges will undergo complete replacement, four bridges have been identified for retention. These bridges, although requiring maintenance and refurbishment, are structurally sound and continue to serve their intended purpose effectively. This decision reflects a balanced approach to resource allocation, allowing for the preservation of valuable assets while focusing resources on critical upgrades elsewhere.

2.1.3.3 Scope of Works on Bridges:

The 16 bridges scheduled for complete replacement will undergo a thorough reconstruction process. This includes the demolition of the existing structures, followed by the construction of modern, wider, and double-lane bridges. These new bridges will be designed to meet current safety standards and accommodate the region's growing transportation needs. The

four retained bridges will receive essential maintenance and rehabilitation. This will involve structural repairs, as well as improvements to ensure their continued reliability and safety. These bridges will be brought up to current standards to align with the upgraded road section. **Table 4** summarizes the bridges to be replaced and those retained per phase.

Table 4. Summary of Bridge Replacement and Retention for the Benga – Dwangwa Road Rehabilitation Project

	Bridge	New bridge to be constructed	Retained	Phase
	Chamakuwi	✓		Phase I
	Chia		✓	Phase I
	Kanjamwana	✓		Phase I
	Ling'ona	✓		Phase I
	Mnchandire	✓		Phase I
	Saliwona	✓		Phase I
	Bua		✓	Phase II
	Chamachete	✓		Phase II
	Chizeu	✓		Phase II
	Dwangwa		✓	Phase II
	Kaombe	✓		Phase II
	Kasangazi	✓		Phase II
	Khako	✓		Phase II
	Liwaladzi		✓	Phase II
	Lunga	✓		Phase II
	Mikongwe	✓		Phase II
	Misenjere	✓		Phase II
	Navunde	✓		Phase II
	Tipati	✓		Phase II
	Walemera	✓		Phase II

Figure 6 illustrates the planned replacement of the existing Kanjamwana Bridge with a new, modern structure. The old bridge, which is currently in use, will be retired and replaced as part of the comprehensive rehabilitation and upgrade of the M005 road section from Benga to Dwangwa. The new Kanjamwana Bridge is designed to meet contemporary safety and traffic capacity standards, providing improved connectivity and ensuring the continued reliability of this crucial transportation route. While in Figure 7, shows Dwangwa Bridge, which is among the four bridges chosen for retention within the M005 road rehabilitation project. Unlike the bridges marked for replacement, Dwangwa Bridge will not undergo complete reconstruction. Instead, it will be subjected to essential maintenance and refurbishment to preserve its structural integrity and functionality.

Figure 6. Showing New Kanjamwana Bridge which will replace the old one

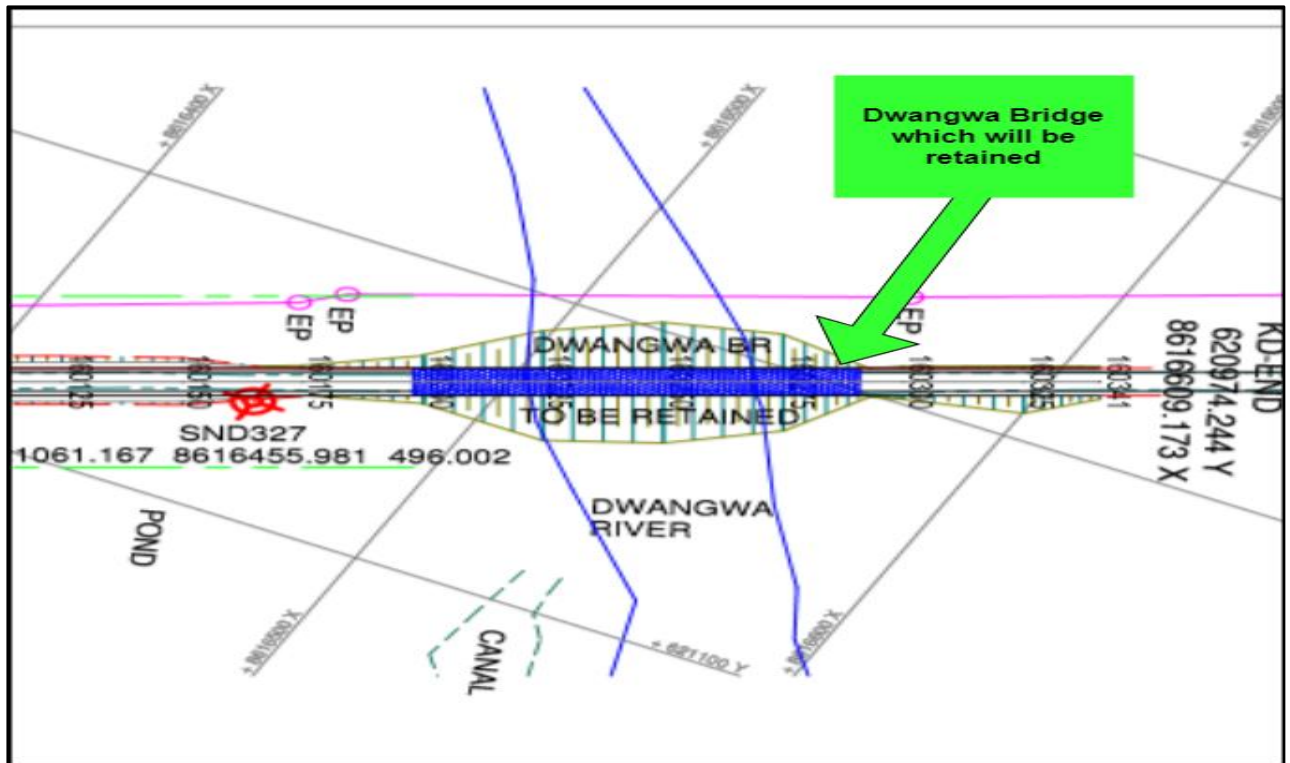


Figure 7. Showing Dwangwa Bridge which will be retained

The drainage system along the road will also receive significant improvements to mitigate water-related issues and enhance road longevity. These upgrades are essential to maintain the integrity of the road infrastructure and prevent damage caused by inadequate drainage.

In addition to the bridge upgrades, the road itself will undergo a comprehensive rehabilitation. The existing road surface will be removed and replaced with a new one, featuring a typical cross-section with a width of 9.7 meters. This cross-section includes 3.35-meter lanes in both directions and 1.5-meter shoulders on each side (Figure 8). The new running surface will consist of a double bituminous surface treatment (DBST) with 19mm and 9.5mm aggregates, ensuring durability and improved road quality.

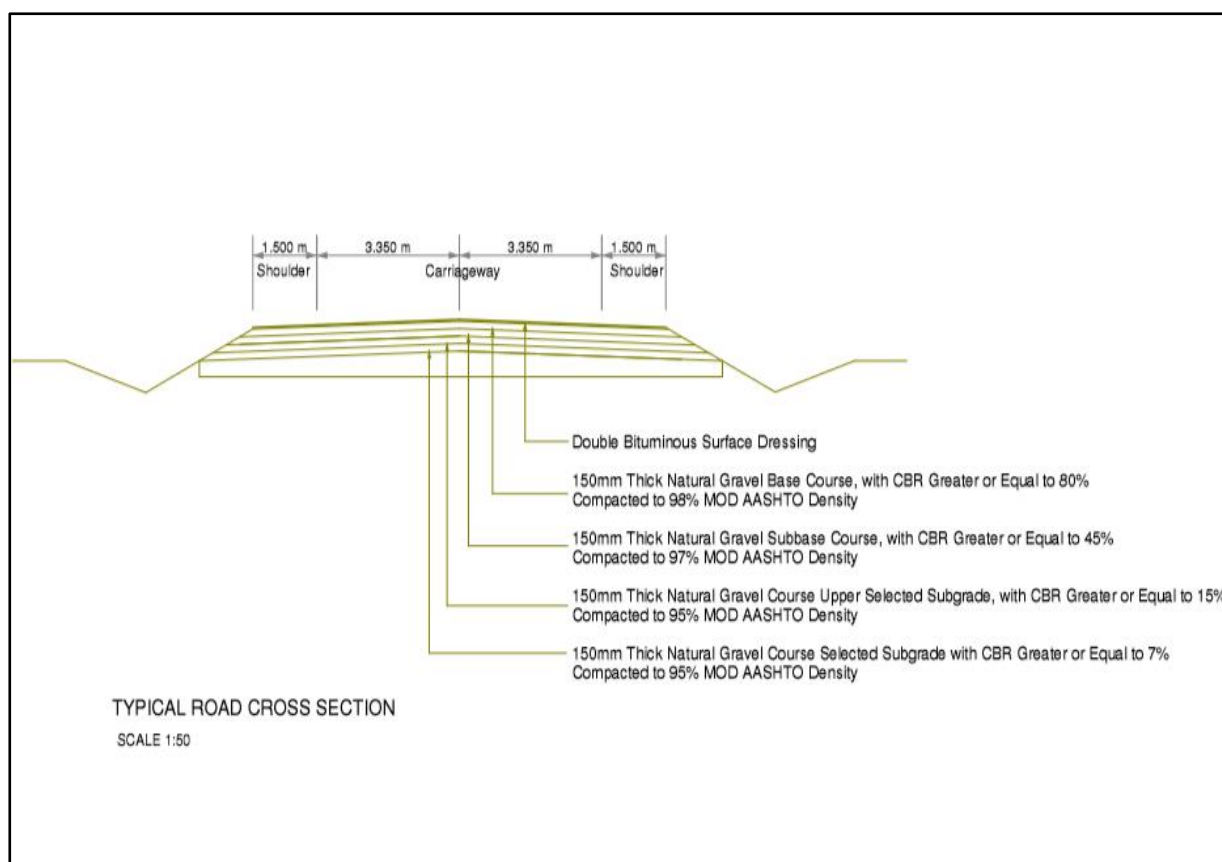


Figure 8. Showing a typical Cross section of the new road.

It's worth noting that while these plans represent the current project scope and designs, they are subject to potential alterations. The Roads Authority may engage a design review consultant who could introduce modifications to ensure the project aligns with the best practices and evolving needs of the region.

2.2. Justification of the project.

The significance of the Benga-Dwangwa Road Project stems from its critical role in addressing the deteriorating condition of the M005 Road, a vital transportation artery in Malawi. The existing state of the M005 Road, characterized by deteriorated road surfaces, inadequate drainage, and narrow single-lane bridges, has raised concerns regarding safety and acted as a significant impediment to economic development in both the central and northern regions of the country. The rehabilitation and upgrading of this road represent a pivotal opportunity to enhance regional connectivity, road safety, and contribute substantially to economic and agricultural growth within the region.

2.2.1. Addressing Infrastructure Deterioration:

Presently, many sections of the M005 road are in a state ranging from fair to poor, with only a few segments still maintaining good conditions. Notably, the Benga-Dwangwa Road section has been particularly affected, often becoming impassable during the rainy season due to the heavy rainfall experienced in the area. The existing drainage structures have proven inadequate, often being washed away during heavy rains, resulting in significant damage to the road. Additionally, it's essential to recognize that the road's construction dates back to 1976-1978, with the last resealing efforts taking place in 1994/1995 and 2000/2001 for the Nkhotakota-Dwangwa and Benga-Nkhotakota sections, respectively. Over time, the road has faced continuous deterioration, exacerbated by the increasing burden of heavy traffic (as evidenced in Figure 9). This deterioration has incurred substantial costs for the government in terms of routine and periodic maintenance.



Figure 9. Traffic along Benga – Dwangwa road

2.2.2. Economic and Agricultural Implications:

The Benga-Dwangwa Road is not merely a transportation route; it is a lifeline for economic and agricultural activities in the region. Its dilapidated state has impeded the efficient movement of goods and people, resulting in economic losses and reduced access to essential services. By upgrading and rehabilitating this critical road section, the project will not only restore the road's functionality but also unlock the full economic potential of the central and northern regions of Malawi. It will facilitate the smooth transportation of agricultural produce to markets, encourage trade, attract investment, and stimulate economic growth, aligning perfectly with Malawi's Vision 2063, a vision that seeks to establish resilient infrastructure to foster national growth and connectivity.

The existing attempts to maintain the road through routine maintenance, such as patching, reconstructing washed-away sections, and drainage improvements (as illustrated in Figure 9), have proven futile and financially burdensome. Frequent damage and washouts, particularly evident in Figure 10, underscore the road's vulnerability and the limitations of the current maintenance approach.



Figure 10. Reconstruction of washed away section near Mkaika Filling station: a deep gully formed a stream and washed away the section.

The presence of single-lane bridges, as depicted in Figure 11, has been a significant road safety hazard. The narrow bridges not only impede the flow of traffic but also pose risks to road users. Therefore, there is a compelling need to rehabilitate these single-lane bridges, expanding them into double-lane structures to enhance both safety and traffic efficiency.



Figure 11. State of single lane bridges along Benga – Dwangwa road

Several distress indicators have been identified along the Benga-Dwangwa road, listed in approximate order of severity, including:

- ✓ An aged road surface that exhibits significant stone loss and provides an ineffective seal, allowing water ingress into the pavement, resulting in various forms of distress.
- ✓ Kerbs on high embankments that have retained water in the base, leading to significant rut development, compounded by other distress indicators in the outer wheel path.
- ✓ Encroachment of uncut grass on the shoulders, which has reduced the available width and poses dangers to pedestrians and cyclists, forcing them off the shoulder.

- ✓ Significant edge breaks on the shoulders, particularly over embankments, possibly caused by livestock accessing the road

The Malawi Vision 2063 sets forth the imperative of establishing a world-class, well-maintained, and expanding road network that connects urban and rural areas to local and international markets. This vision emphasizes upgrading all major roads to bitumen standards, linking them to world-class national and regional motorways, and supporting them with multi-year maintenance programs. Consequently, the Benga-Dwangwa Road Project aligns perfectly with this vision, contributing significantly to the development of Malawi's road sector. The project aims to elevate the standards of the national road network, establishing a seamless connection from north to south through the Lakeshore as part of the Ntwala road corridor.

The project is also expected to yield a multitude of socioeconomic and developmental benefits. It is anticipated to generate employment opportunities and facilitate knowledge and skills transfer within the communities surrounding the project sites. Furthermore, it will enhance traffic efficiency and safety measures on the road, leading to improved industrial manufacturing, including increased agricultural production. By reducing travel time and business operating costs, the project will provide better access to social services and stimulate economic growth in the region. In essence, the Benga-Dwangwa Road Project represents a transformative endeavor that not only addresses infrastructure needs but also fosters holistic development and prosperity for the people of Malawi.

2.3. Project Cycle Stages.

The rehabilitation of the Benga-Dwangwa (M005 section) 100km road will follow four essential project cycle stages, each with its distinct set of activities and objectives. Their respective details shall be discussed in the paragraphs below:

2.3.1. Pre-Construction stage (Project planning and design phase).

The Pre-Construction stage constitutes the initial phase of the project, primarily dedicated to meticulous planning and comprehensive design. It encompasses a range of crucial activities that lay the foundation for the successful execution of the rehabilitation project.

These major activities, carried out during pre - construction stage include Feasibility Study with surveying the road, Economic Assessment, geometric design of the road, earthworks design, bridge and culvert designs, road pavement design, identification of borrow pits, Environmental and Social Impact Assessment (ESIA), Resettlement Action Plan (RAP) and Preliminary Engineering Design of the road.

Feasibility Study.

The stage commenced with a thorough Feasibility Study, which involves surveying the road, assessing its economic viability, and determining the overall feasibility of the rehabilitation project. This study serves as the bedrock of informed decision-making.

Geometric Design.

Geometric design considerations are fundamental to the stage. The design team focused on defining the road's alignment, curvature, and overall layout to optimize safety and functionality.

Earthworks Design.

Detailed earthworks design involved planning the excavation, embankment, and grading activities necessary to achieve the desired road profile and drainage characteristics.

Bridge and Culvert Designs.

Bridge and culvert designs are essential components of the Pre-Construction stage. These designs ensure that the road's water-crossing structures meet safety and capacity requirements.

Road Pavement Design.

A robust road pavement design was formulated to determine the appropriate materials and construction methods to ensure the road's durability and performance over time.

Identification of Borrow Pits.

The identification and assessment of borrow pits, from which construction materials are sourced, were undertaken to ensure a sustainable supply of required materials.

Environmental and Social Impact Assessment (ESIA).

An ESIA is conducted to evaluate and mitigate the environmental and social consequences of the project. This assessment ensures that the project adheres to environmental regulations and safeguards local communities.

Resettlement Action Plan (RAP).

A Resettlement Action Plan is being developed to address the displacement of affected communities or individuals and ensure their fair and adequate compensation or resettlement.

Preliminary Engineering Design.

The stage culminates in the creation of a Preliminary Engineering Design of the road, incorporating all design elements, standards, and specifications necessary for the project's execution.

Property Clearance.

During the feasibility study, it was identified that some properties encroach upon the prescribed road servitude, which is established to be 60 meters wide. In order for the project to be implemented in a required manner, the RRB is required to be cleared of any properties and developments.

2.3.2. Construction stage.

The activities to be undertaken during construction of the road shall include relocation of displaced persons from the Right of Way (ROW), selection of the camp site, construction of diversions, land clearing, formation of roads carriageway, cutting of top soil to spoil and fill, construction of base and sub-base, surfacing of carriage way and rehabilitation of drainage structures.

2.3.2.1 Relocation of displaced persons from the ROW.

As per the Road Act, the road is classified as a primary road with a right of way of 60m. The ROW will cater for the carriageway, shoulders and street-furniture. To allow for safe

construction, operation and function of the road of such a standard, no buildings or activities are allowed within the ROW.

2.3.2.2 Selection and construction of the camp sites.

The successful execution of the Benga-Dwangwa Road Rehabilitation Project necessitates the establishment of strategically located camp sites. The selection and construction of these sites are pivotal to support project operations, provide shelter and amenities to the labor force, and facilitate efficient storage of building materials and equipment. Several key considerations will guide the process of selecting and developing the campsite:

Site Selection Criteria:

The topography of potential camp sites will be a critical factor in the selection process. Sites with relatively level terrain will be preferred to ensure ease of construction and accessibility. The suitability of the terrain for infrastructure development and minimizing environmental impact will be a prime consideration. The Camp sites will be strategically located within the vicinity of the road project. This proximity ensures efficient access to the construction site and minimizes transportation time for labor and materials. It also enhances project supervision and coordination. The campsite shall have access to a reliable water source. Environmental factors, including the preservation of local ecosystems and minimizing disruption to wildlife and vegetation, will be taken into account during site selection. Sites will be chosen to have minimal environmental impact.

Camp Site Construction:

Once suitable locations have been identified, the construction of camp sites will commence. The following key activities will be undertaken during this phase:

- The selected sites will be cleared of vegetation and prepared for construction. This includes removing any obstacles, debris, or natural vegetation that may hinder the development of the camp.
- Temporary shelters will be erected to provide shelter and accommodations for the labor force. Adequate storage facilities will be constructed to safeguard building materials and equipment.

- Toilets and bathrooms will be constructed on the camp sites to provide essential sanitation facilities for the workforce, ensuring hygiene and well-being.
- To minimize dust and prevent mud accumulation during inclement weather, the ground surface of the camp site will be covered with aggregate stone, creating a stable and clean environment for workers.
- A separate ESMP will be developed specifically for the camp site. This plan will address environmental safeguards, social responsibilities, and measures to mitigate any adverse impacts associated with the camp's presence.

2.3.2.3 Constructing diversions.

Diversions in a form of temporary roads will be required to service traffic during the rehabilitation period. Construction of the diversions shall require additional land and will involve clearing vegetation and excavation of land which will result in destruction of vegetation. To avoid requirement for extra land for diversion and destruction of vegetation, roads construction activities should involve one lane at a time.

2.3.2.4 Development of borrow pit sites.

To meet the increased material requirements resulting from the additional feeder roads incorporated into the project scope, a thorough assessment has been conducted. Following this assessment, it has been determined that the feeder roads will not require additional borrow pits beyond those identified for the Benga-Dwangwa road listed under Table 5. Therefore, the project will utilize the borrow pits already identified for the main road rehabilitation. These borrow pit sites will serve as crucial sources of gravel materials necessary for construction activities, including the various cuts and fills along both the main road and feeder roads.

The development of these borrow pit sites involves the excavation of land and the rehabilitation of gullies in specific areas. To ensure responsible and environmentally sensitive operations at these sites, the contractor will need to develop a separate ESMP specifically tailored to the borrow pits identified. This plan will outline measures to mitigate potential environmental impacts, ensure compliance with regulations, and address any social concerns related to the development and operation of the borrow pits. By adhering

to these guidelines and implementing appropriate measures, the project aims to conduct borrow pit operations in a sustainable manner while meeting the material requirements essential for the successful completion of the rehabilitation project

Borrow Pit Site Development:

Suitable locations for borrow pit sites have been identified and selected based on factors such as proximity to the project area, availability of required materials, and adherence to environmental, social and regulatory guidelines. The selected borrow pit sites will undergo excavation and material extraction processes to obtain the necessary gravel and construction materials. Care will be taken to minimize environmental impact during these activities. Gullies will be rehabilitated to mitigate soil erosion and environmental degradation. This rehabilitation process will involve filling and stabilization of gullies to restore ecological balance.

Preparation of the Borrow Pit Management Plan.

To ensure that borrow pit site development is conducted responsibly and in compliance with environmental and social standards, a separate ESMP will be formulated. This ESMP will address various aspects, including:

- Measures to protect natural ecosystems, minimize soil erosion, and prevent adverse impacts on local flora and fauna.
- Strategies for engaging with local communities, addressing any potential social concerns, and ensuring fair compensation or mitigation for affected individuals or communities.
- Adherence to all relevant environmental laws and regulations to ensure that borrow pit site development is conducted in a legal and ethical manner.

2.3.2.5 Land Clearing.

Rehabilitation of the road will include clearing of the road with graders; stock piling of gravel at the borrow pits nearest to the project areas with bull dozers; preparation of the beds of the roads; hauling of gravel from the approved sources; processing of gravel with graders, rollers and water bowsers; and preparation of the sides drains for the roads. The rehabilitation of the roads will involve removal of unsuitable materials, which shall include

vegetation and topsoil. Other activities will include leveling the ground and excavated material from drainage structures.

2.3.2.6 Formation of Road Carriageways

The activity will involve setting out of the road to transfer the road designs onto the ground. During setting out of the road, the vertical alignments of the road will be considered in relationship to drainage systems.

In some places, the course of the road will be moved to avoid waterlogged areas if effective drainages cannot be achieved. In cases where it will not be possible to change the roads alignment, embankments will be formed where more fill materials will be excavated from the road sides to raise the carriageways and gain effective drainages.

Where the in-situ materials will not be suitable for the construction of the surfaces of the road, the construction materials will be imported from elsewhere. The materials will include: stones, sand, water and fill material (gravel).

2.3.2.7 Cutting of top soil to spoil and fill

The road works will involve remove top layer and construction or road related infrastructure therefore, there will be cutting and filling to accomplish leveling. All the materials which will be cut will be filled to lower places.

2.3.2.8 Drainage structures

The drainage structures will include installation of pipe culvert lines, inlet and outlet structures and masonry check-dams. The construction of the drainage structures will utilize materials such as sand, aggregate stones, cement, suitable fill material, gravel, reinforcement steel (wire mesh) and water. Side and mitre drains will also be constructed. Construction of side and mitre drains will involve excavation of the sides of the roads. Water from the surfaces of the roads will be drained into the side drains and run along the roads, which will eventually be drained out of the roads system through mitre drains.

The pipe culverts will either be of 900 mm or 600 mm or 500 mm depending on the amount of water to be drained. The pipes will have to be of reinforced concrete of class 20/20 concrete. The minimum thickness of the pipes will have to be 75 mm. The pipes will be installed on the treated excavated grounds. The grounds will be treated with gravel and will be compacted before laying the pipes. The minimum cover for the pipes will be almost 500 mm with natural or imported materials.

Once the pipe culverts have been installed there will be need of the inlet and outlet structures. These are the structures which will direct water into the culverts and channel the water out of the culverts. The structures will mainly be in stone masonry; hence stones, sand and cement will be required.

Check dams will be built across the side drains to reduce the speed of water flowing through the drains. If the water will be flowing with high speed it will increase erosion hence big galleys will be formed.

The roads rehabilitation works shall use different materials and equipment. These shall include bricks, gravel, stones, sand, cement, aggregate stones, culvert pipes of different sizes, graders, dozers, excavators, front end loaders, water bowsers, compacting rollers, tipper trucks, Lorries, concrete mixers and concrete vibrators.

2.3.2.9 Surface Dressing

This activity involves application of prime coat, application of bituminous binder, spreading and compaction of 13.2 mm rock sized aggregates and application of slurry. Other works include surface dressing and moving from section to the subsequent with considering a minimum buffer time between start of surface dressing activities and base course activities for the same section due to the different rate of constructions between the base course and surface.

2.3.2.10 Ancillary Road Works

This activity starts soon after finishing of the surface dressing works and the works include construction of bus bays, road marking, road signs, landscaping and finishing of road.

2.3.2.11 Testing and Quality Control

It includes the testing of materials and workmanship during the whole execution of the road to guarantee the required quality of works. It also involves testing the moisture content of the road.

2.3.2.12 Materials and sources

The project will use the following materials:

Gravel: The contractor will source and negotiate for prices directly with the communities. The gravel will be used for putting the first resurfacing layer of the road. The District Council will keep records of all the sources of gravel and all the pits created shall be refilled by the contractor during the operation stage.

Crushed stone: The crushed stone will be used for filling the second resurfacing layer of the road. The sizeable rocks will be used for filling soil erosion control structures such as gabion boxes where others for drainage construction.

Quarry dust: The dust will be used for moulding of cement blocks for drainage construction.

Cement: The cement will be sourced locally for the road and drainage construction. This will promote the local business in the two districts.

Anti-termite chemicals: The contractor will use the chemical for treating the road for termites. The contractor will only use the recommended biodegradable chemicals sourced from authorised dealers.

Asphalt: This will be sourced outside the country and will be used for road surfacing coat. Taxes will be collected through the importation of this material.

2.3.2.13 Machinery and Equipment

Earth works machinery and equipment to be used include machinery such as Caterpillar tractors (road graders), front loaders, tippers for moving earth materials, road compaction machinery such as rock crushers and road marking machinery.

The rock crushing will be done at within the hills along the road and be transported by trucks for the road construction and as such there would be a lot of traffic movement during the construction of the road. The machinery will be doing most of the works (about 60%) during the implementation.

2.3.3 Demobilization of Construction Works

Demobilization works will commence immediately after completion of the works. Main activities during demobilization phase of the project will include demolitions of temporary contractor's camp, temporary housing structures for migrant workers, temporary storage facilities, reinstating excavated areas. Demobilization exercise will also include termination of contracts and removal of excess construction labour force including migrant workers. Migrant workers will be assisted to return to respective homes.

Other important activities will be clearance of debris/wastes from the premises and removal of some project equipment and machinery from the area. These activities will be carried out by contractors concerned. Contractor will undertake thorough clearing/rehabilitation works of the camp site and handover land to original owners. Activities will include rehabilitation of all borrow pits, planting of grass and trees within recommended areas of the project. The final decommissioning report will be sent MEPA for certification of rehabilitation.

2.3.4. Operational activities of the roads

This stage will commence soon after construction works. Main operational activities will be movement of vehicles, people and local transport facilities such as bicycles, and oxcarts on the roads. Main activities on the roads are categorized as follows:

- a) Connecting the country from North to South through the Lakeshore.

- b) Easy transportation of farm inputs/ finished goods to market centers. Examples of farm inputs to be transported will be fertilizers, pesticides, hybrid seeds and farm machinery. Improvement on the conditions of the roads will reduce travel time.
- c) Smooth movement of people - Rehabilitation of the road will facilitate smooth movement of private owned vehicles, motorcycles and bicycles in transportation businesses. Improvement on the conditions of the road will also reduce travel cost and time.

2.4. Environmental Planning and Design

The Environmental Planning and Design section highlights environmental and social issues to be considered during the detailed design stage of the project. The inclusion of these issues in the detailed designs will ensure that identified negative impacts are mitigated and positive ones are enhanced. There is need for environmental planning and design on issues relating to earthworks; construction methods including handling of materials, protection of soils against erosion etc; sources of construction material and handling of such materials; safety and public health issues; labour issues; and rehabilitation/revegetation issues.

2.4.1. Determination of the size of Road Reserves:

This is a road rehabilitation project and the road reserve shall remain unchanged however it will involve moving some infrastructure that have been constructed within the road reserve. Ensure that the road reserve is adequate for any future expansion activities of the road. The road reserve will also facilitate number of things including passage of power lines and water reticulation, enhancing visibility for drivers and promoting scenic roadside views. Further, there will be land acquisition, resettlement, and compensation of impacted persons during determination of the size of road reserve.

2.4.2. Earthworks

The earthworks will generally be restricted to road widening, drainage works, provision of access roads and detours and at borrow pits and quarry sites. The road will by and large follow the existing horizontal and vertical alignment with improvements on curves especially between Nkhotakota and Dwangwa. If the road was to divert for the most part

from the existing alignment there would be major disruptions on surrounding properties and natural environments. The vertical profile of the road across the alluvial plains is low hence the road flooding around these sections. The vertical profile should be raised at these sections. The flooding could also be due to inadequate cross drainage. Hence the need to provide adequate drainage structures at these road sections. During earthworks, top soil will be excavated and stockpiled to be reused later during re-vegetation of plants on embankments. Top soil is the seed bank and its use for rehabilitation works will allow quicker re-vegetation of the affected areas and the ESMP under 8.1 has the mitigations measures for the impacts.

2.4.3. Borrow pits, Quarry Sites and sand.

There is need to take extra care in sourcing raw materials such as gravel, quarry stones and sand for the construction of the road. About Nineteen (18) borrow pits along the project road have been identified by the Materials Investigation Engineers (*Figure 12*) and all these sites are within the district. Nine (9) of the Nineteen borrow pits already exist (*for details see Table 5*). Also, one existing quarries around Bua will be used for the project road. Lake sand will be used in making structural concrete. All these raw materials (gravel, quarry stones and sand) should be excavated with utmost care. Workers at these work sites should be provided with dust masks and supervisors must ensure their proper and regular use. Access roads from these sites should occasional be sprinkled with water to reduce dust. Also ensure that excavated materials being transported are well secured within vehicles and covered to minimise the risk of being blown by wind or spilling out due to overfilling and causing damage to other vehicles and to air quality and surrounding communities.

All borrow pits need to be fully rehabilitated soon after the completion of any the road segment in order to minimise environmental and social impacts. The contractor will need to ensure that sand mining is controlled and all mining sites be fully rehabilitated before project decommissioning. To ensure full compliance the contractor will develop separate borrow pit ESMP which will be submitted to MEPA for approvals and necessary permits.

Table 5 Identified borrow pits and Quarry sites.

SN	Coordinates of CH	Distance to borrow pit from CH	Coordinates of borrow pit	Size (Sq. Meters)	Status	V.H	TA	Land use
Borrow Pit	E 0635378 N 8520018	230m	E 0635281 N 8519978	15, 000	New		Mwazama	Forest (man- made & natural)
Borrow Pit	E 0635739 N 8520500	500m	E 0636198 N 8520416	9, 600	Existing		Mwazama	Borrow pit
Borrow Pit	E 0636180 N 8521068	40m	E 0636143 N 8521096	8, 800	New		Mwazama	Garden (Field)
Borrow Pit	E 0638081 N 8525958	10m	E 0638081 N 8525958	6, 500	New	Madzi Kusamba	Mwazama	Garden (Field)
Borrow Pit	E 0639413 N 8532438	10m	E 0639413 N 8532438	14,000	New		Mwazama	Natural Forest & Bush
Borrow Pit	E 0639582 N 8536162	10m	E 0639582 N 8536162	16,000	New		Mwazama	Garden (field) & Bush

SN	Coordinates of CH	Distance to borrow pit from CH	Coordinates of borrow pit	Size (Sq. Meters)	Status	V.H	TA	Land use
Borrow Pit	E 0639582 N 8536162	10m	E 0639582 N 8536162	20,000	New		Mwazama	Garden (field), Bush & Natural Trees
Borrow Pit	E 0640719 N 8537330	6.8km	E 0634520 N 8536769	30,000	New		Mwazama	Garden (field), Bush & Natural Trees
Borrow Pit	E 0642246 N 8539517	5km	E 0642454 N 8534826	24,000	New		Mwazama	Garden(field) + Natural Trees
Borrow Pit 10	E 0640692 N 8556108	6km	E 0635866 N 8554331	12,200	Existing		Malengachanzi	Borrow pit
Borrow Pit 11	E 0639208 N 8570612	15.7km	E 0639208 N 8570612	16,000	Existing	Sesani	Malengachanzi	Borrow pit
Borrow Pit 12	E 0639208 N 8570612	7.3km	E 0636474 N 8564904	10,500	Existing	All Kanyenda	Malengachanzi	Borrow pit
Borrow Pit 13	E0633492 N8565596	15.7km	E0630879 N8559485	10,500	Existing		Kanjiru	Borrow pit

SN	Coordinates of CH	Distance to borrow pit from CH	Coordinates of borrow pit	Size (Sq. Meters)	Status	V.H	TA	Land use	
Borrow Pit 14	E0634254 N8580391	2km	E0632364 N8580111	18,400	Existing		Chikombe	Borrow pit	
Borrow Pit 15	E0634254 N8580391	2.7km	E0631853 N8579744	7,800	Existing		Kabululu	Borrow pit	
Borrow Pit 16	E0634254 N8580391	4.1km	E0631304 N8578715	50,400	New		Nkosi	Bush with Natural Tree	
Borrow Pit 17		75km	E062592 N859742	16,000	New		Mwasima	Fields and Bush with Natural Trees	
Borrow Pit 18		4.1km	E6624770 N8602054	57,570	Existing		Chambwandi	Borrow pit	
Borrow pit 19		100m	E0619975 N8620679	20,000	Existing		Kawanga	Borrow pit	
Quarry 1			1km			Nkhotakota		Bua	Quarry Pit

TRIG PILLARS AND BORROW PITS

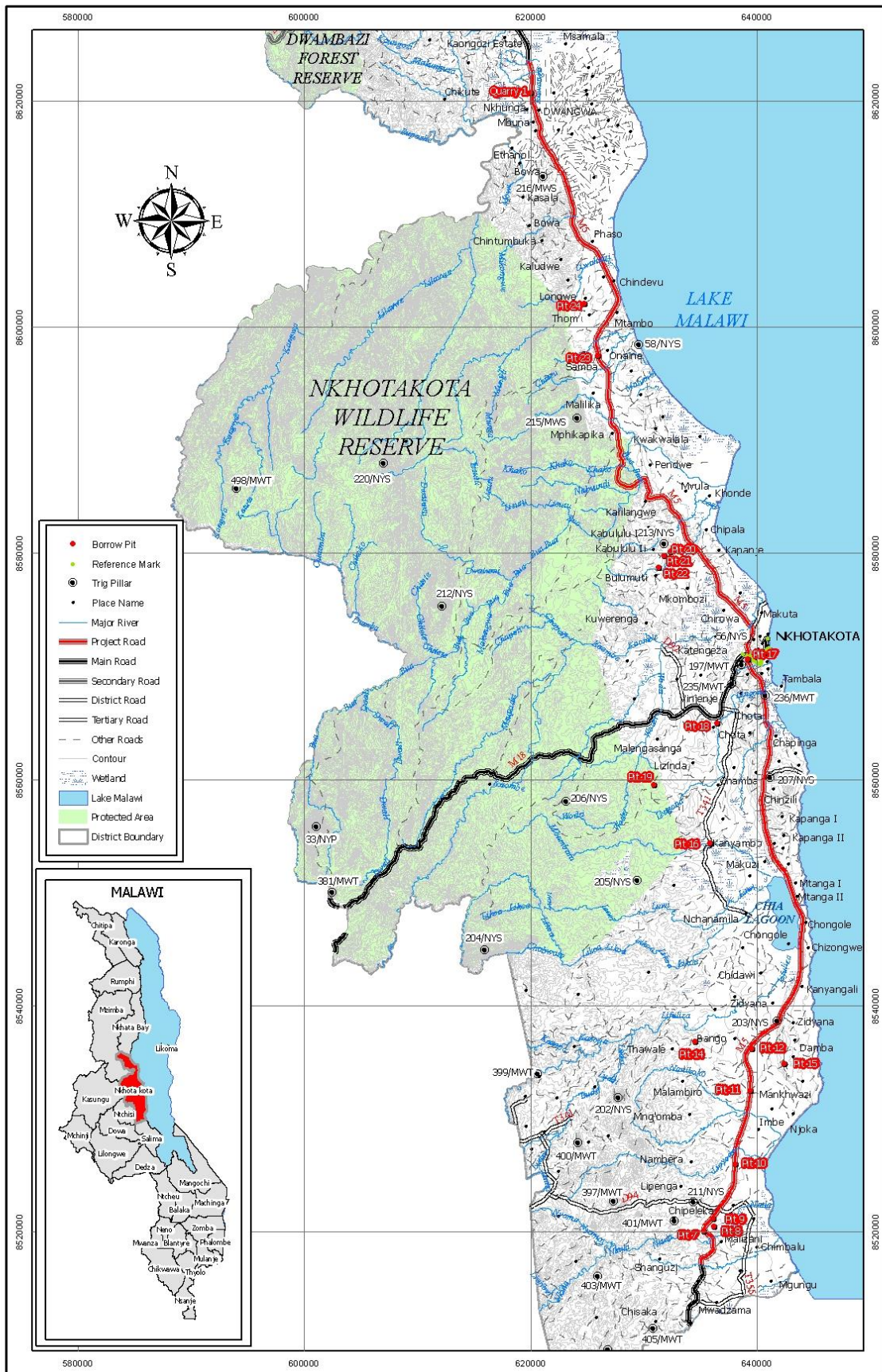


Figure 12 Borrow Pits locations

2.4.4. Construction and General Operations.

Standard precautions for environmental health and safety procedures should be taken into consideration. The contractor will ensure that standard precautions for safety procedures are taken into consideration to prevent accidents, and spillages of oils other toxic substances. The contractors will prepare contingency plans for containing and treating accidental spillages which are going to be adhered to and monitored. Stockpiles and excavations are expected to be sprinkled with water in order to reduce dust generation especially on windy days. Sediment and other pollutant traps will be located at drainage exists from the workings. Impacts have been identified and will be managed through an ESMP.

2.4.5. Culverts and Box culverts.

Culverts, whether they are box culverts or pipe culverts, often require soil stabilization around the localized area of culvert placement, especially at the inlets and outlets. To stabilize soil conditions around culvert Inlets and Outlets gabion headwalls, wing walls, and scour aprons are recommended. Headwalls are designed to protect the slopes of an embankment against lateral scour as well as retain the embankment itself and to increase culvert efficiency by providing a flush inlet as opposed to a projecting one. The scour apron is placed at the base of the inlet or outlet and is designed specifically to prevent scour and erosion on the base. A scour apron is often required, on the base, at the inlets or outlets of culverts to inhibit scour, stabilize soil conditions, and reduce flow velocities to allow for a transition from culvert to native soil. The culverts will be located in such a manner as to reproduce the natural drainage pattern as much as possible. This will serve to minimize disturbance to the existing soil water regime.

2.4.6. Drainage structures.

The road will be constructed with appropriate drainage systems to avoid water retention on the road surfaces and sides. The wider the side drains inlet the lower will be the flow velocities and likewise the potential for erosion. With the improvements in drainage efficiency following the construction of a paved road surface, particular attention will have to be paid to the prevention of erosion in side drains, below side drain turnouts and

culverts outlets. Check dams will be constructed in steep slope side drains sections to reduce velocity of runoff water and minimize soil erosion. These will act as sediment control structures to trap suspended sediment transported by runoff. Runoff shall be frequently diverted into culverts to avoid erosion. Where the side drains cannot discharge into culverted gullies, these ditch drains shall discharge water into vegetated areas through the use of turn outs. The embankment of the ditches shall be planted with vegetation to stabilize its soils and protect it against erosion. However, this can lead to significant reductions in hydraulic efficiency, if they are not regularly cut back. The spacing of turnouts will depend on the hydraulic capacity of the side drain, its gradient and the prone to erosion of the materials forming its boundary. In practice, the details of topography adjacent to the road will determine the final spacing and location of turnouts. Turnouts are usually designed in such ways that are of such a length that run out to zero depth.

2.4.7. Safety and public health.

Road and associated infrastructure construction poses health and safety hazards to the workforce, surrounding communities and road users. As such, health and safety issues must form part of the environmental planning and design. Some of the safety precautions that should be in place during construction are outlined below and the Contractor will be expected to follow all safety precautions listed down in the Conditions of Contract:

- a) Adequate road signs to warn pedestrians and drivers of construction operations and diversions are constructed;
- b) Provide for speed limit for construction vehicles;
- c) Hoarding around deep excavation and noise emitting plant operations;
- d) Fencing around plant and fuel storage facilities, periphery of construction sites and plant operating sites;
- e) Follow standards and procedures for storing and handling of toxic materials;
- f) Contain any spillage materials to avoid pollution of the ground and surface water;
- g) Provide all the workers with protective equipment and impose their use; and
- h) The contractor will abide by national laws on occupational health and safety regulations.

2.4.8. Labour Force.

The Benga – Dwangwa (M005) road project is expected to create job opportunities in the project area. This may be a training ground for the local people who may not have not been employed elsewhere. The project is and will offer employment to several skilled and unskilled labour force. At least 70% of the employees will have to be local people and 30% will be skilled labour force which might include both locals and expatriates. The proponent will have to maximize employment of Malawians while paying particular attention to gender consideration with at least 40% women. Local unskilled labour force will have to be given priority. For some of the less complex tasks, local unskilled labour should be given short term on the job training. For work that can be done using human labour the use of machinery is discouraged. Some of the labour-intensive construction activities include grubbing, drawing of water, hand knapping of masonry stone and construction of masonry structures, filling of gabion boxes, painting road surface markings and vegetation planting schemes on earthworks. Other likely chores include food preparation, cleaning, security, drivers and secretarial duties. Promote and employ women to work in the project as one way of strengthening their position in the society.

2.4.9. Planning of Camps and Waste Disposal Sites.

Prior discussion with Nkhotakota District Council and the Traditional Leaders in the areas is required before placement of the labour camps and waste disposal sites. The general principle is to allocate the labour camps on land of low community value not very close to existing settlements to minimize conflict and avoid transfer of impacts caused by camps to these settlement areas. Labour camps for the project are expected to be sited towards the centre of the road project and the contractor need to ensure that pulling down or rehabilitation during and at the end of the project is easy. There will be need to site the labour camp near a reliable water supply but where it will not interfere with the local community water supplies.

Retention bunds should be constructed around fuel and oil storage areas and all drainages and effluent should be treated before being discharged into the drainage system. During district level consultation the Environmental District Officer (EDO) mentioned that currently

Nkhotakota does not have a waste management plan, the contractor will need to discuss with the Council to identify an appropriate site for dumping and follow national waste management guidelines in waste disposal. It is advisable to engage the traditional leaders and Nkhotakota District council before deciding the actual location of the waste dumping site.

2.4.10. Water Abstraction.

The contractor will need to give due consideration to the abstraction of water for construction purposes to ensure not to affect the water needs of the people and livestock in the area. Since the project area has major rivers such as Dwangwa, Bua, Kachiya, Liwalazi, Nkhula and others, water abstraction rights need to be sought from the National Water Resources Authority (NWRA).

2.4.11. Rehabilitation.

Once extraction is completed from borrow pit areas, they should be backfilled where possible to return the ground surface to its original landform, if this is not going to be possible they should be drained. The backfill should be free of foreign materials that could break down and pollute groundwater and soil chemistry; this entails that toxic materials should be removed and disposed of safely. Backfill should be adequately compacted to prevent erosion of surface materials and to avoid settlement and creation of depressions in which water could collect. Replanting schemes should be designed to prevent erosion on the reinstated surface and create a vegetation cover comprising indigenous grasses, shrubs and trees. Seedlings may be propagated in nurseries throughout the area, making use of the expertise of the forestry extensions officers as well as extensive community participation. Seedling nurseries should be established in the season before planting is expected to commence.

2.4.12. Maintenance.

The road maintenance programme should incorporate an on-going commitment to a policy of environmental protection which should include:

- a) Regular clearing of side drains, turnouts and culverts;

- b) Maintenance of vegetation on selected earthworks slopes;
- c) Operation and reinstatement of borrow pits according to the guidelines in the Environmental and Social Management Plan;
- d) Cutting back of vegetation in side drain and roadside locations where uncontrolled growth could significantly reduce hydraulic capacity or impair traffic visibility; and
- e) Maintenance of erosion protection measures.

CHAPTER THREE: POLICY AND LEGAL FRAMEWORK.

3.1. National Requirements.

Malawi has, over the years, developed various national and sector policies, legislations and institutional frameworks for environmental management, in order to guide environmentally sustainable development in various sectors of the economy. The aim of adopting these policies and legislative frameworks is to promote and consolidate sustainable socio-economic development in the country through mainstreaming of environmental considerations in project planning, implementation, operation and demobilisation.

These legislative frameworks include the constitution of the republic of Malawi of 1995 and different policies and pieces of legislation. The developer will therefore be compelled to comply with the different national instruments during the whole period of project implementation.

This chapter therefore outlines the policies, legislative and administrative frameworks relevant to guide and help to monitor the construction of the road. These are listed below and further explained in subsequent sections.

3.2. Policy Framework.

3.2.1. Constitution of the Republic of Malawi (1995)

The constitution of the Republic of Malawi (1995) is supreme over any legal policy or Act in Malawi. Any Act of Government or any law that is inconsistent with provisions of the constitution shall be invalid to the extent of such inconsistency (Section 5). As such, the reviewed policies and legislations, relevant to the project, have to be in line with the constitution.

Section 12 of the constitution provides the fundamental principles on which the constitution was founded and part (iii) encourages accountability and transparent decision-making. Section 12, part (iii) states: *“the authority to exercise power of State is conditional upon the sustained trust of the people of Malawi that trust can only be maintained through open, accountable and transparent government and informed democratic choices”*. The

principle is based on the premise that while society appoints authorities, they return the right to have an input in decision-making and enforcement processes; and they expect transparency in government decision making. In line with this principle, the proposed project cannot assume that it has power over the communities in the project area of influence, knowing that it will be accountable to its actions.

The constitution provides the foundation that guarantees the welfare and development of all the people of Malawi. Section 6 stresses that one of the roles of the state is to enhance the quality of life in rural communities and to recognize rural standards of living as a key indicator of the success of government policies. The proposed project will ensure that implementing the project does not leave the people in the area worse off, but rather improves their life, for example through, employment opportunities.

Under section 13(d), the Constitution of the Republic of Malawi provides for responsible management of the environment and paves way for the enforcement of the National Environment Policy. The constitution accords full recognition to the rights of future generations by advocating environmental protection and sustainable development of natural resources. It also calls for the prevention of environmental degradation. The proposed project will have to ensure that activities of the project promote environmental protection and sustainable development of natural resources.

3.2.2. Malawi Vision (2063)

Malawi 2063 vision is an official document and roadmap by the government of Malawi that details exactly how Malawi will become a self-reliant nation with a minimum per capita income of 4000US dollars by 2063. A globally competitive and highly motivated human resource is among the top ten goals to be completed by 2063. The goal will promote domestic economic activity and spur foreign direct investments for wealth creation. A key enabler to the inclusive wealth creation agenda is economic infrastructure such as energy, ICT, roads, railway, water and airports. The goal shall further develop an efficient multi-modal transport system that is cognizant of the 'time is money' principle and provides for local needs and transitions the country from a land-locked to a land-

linked economy through the development of Road Transport. Below is a quote from the document under goal number ten:

“We shall have a world-class, well maintained and expanding road network connecting the urban and rural areas to local and international markets”

Further, it stipulates that the centrality of an efficient road network to a land-linked country like ours is recognized. We shall thus ensure that our roads are well maintained and upgraded, with complementary infrastructure like streets lights. Transport masterplans at the national, city, town and council levels shall be developed and fully adhered to. We shall upgrade all main roads to bitumen standard linking to world-class national and regional motor ways fully supported with multi-year maintenance programmes. In prioritizing the upgrading or construction of our roads, we shall first consider their socio-economic viability in order to optimize our scarce resources. In meeting the required levels of investment in roads, just like in the other modes of transport, we shall explore non-traditional means of financing such as Public-Private Partnerships (PPPs) models.

The Benga-Dwangwa Road project is a strategic initiative directly supporting the goals of Malawi Vision 2063, which envisions transforming Malawi into a self-reliant nation with comprehensive infrastructure development. Further, this project, by upgrading the road to bitumen standard, will facilitate better connectivity between urban and rural areas, enhancing access to local and international markets. It will contribute to the Vision’s goal of fostering a globally competitive economy and a highly motivated human resource. By improving transport efficiency, the project aligns with Vision 2063’s focus on optimizing resource use and exploring innovative financing models like Public-Private Partnerships (PPPs), enhancing socio-economic viability.

3.2.3. Malawi Growth Development Strategy (MGDS) 2017 – 2022

The overall objective of the Malawi Growth and Development Strategy is to reduce poverty through sustained economic growth and infrastructure development. The strategy has five thematic areas namely:

- ✓ Sustainable economic development.
- ✓ Social protection.
- ✓ Social development.

- ✓ Infrastructure development.
- ✓ Good governance

There are also sub-thematic areas like:

- ✓ Disaster preparedness.
- ✓ Environmental protection.
- ✓ HIV/AIDS prevention

The Benga – Dwangwa Road project implementation should be mindful of these strategy goals. Of particular interest is the alignment of project implementation to environmental protection, HIV/AIDS prevention, social development and protection. This report is about environmental protection during project implementation. Also, the report articulates strategies for addressing issues of HIV/AIDS, hiring local people for the road project and appropriate compensation for displacement of properties.

3.2.4. National Environmental Policy (2004)

National Environmental Policy (NEP) was developed in 1996 and revised in 2004. The National Environmental Policy, 2004, aims at narrowing the gap between degradation of the environment and depletion of natural resources on one hand and development on the other. The overall policy goal is to promote sustainable social and economic development through sound management of the environment and natural resources. This calls for the integration of environmental concerns into national, district and community level planning processes. The NEP Promotes participation of the private sector, NGOs and the community, in order to achieve sustainable environmental management; and involvement of local communities in environmental planning. The NEP also recommends Environmental Impact Assessments that consider biophysical impacts as well as environmental and social impacts in terms of existing social, health, economic, political and cultural conditions.

In line with the requirements of NEP, this ESIA report will encourage the integration of environmental management and protection requirements during project implementation to reduce adverse impacts that the road project may impose on the environment. Construction works for Benga –Dwangwa (M005 section) 100km road shall inevitably lead to clearing of vegetation along the road side, excavation and levelling of soil, water

abstraction, construction of road related infrastructure like drainage systems. These activities will have the potential to cause several environmental and social problems as outlined above. The implication of the policy is that the project will be required to put in place measures to reduce adverse impacts arising from implementation of different activities.

The policy therefore requires that an environmental assessment should be conducted for development projects of this nature as they are likely to have significant environmental and social impacts in the project impact areas and beyond. The environmental assessment will assist to ensure that such development projects are implemented in an environmentally and socially sustainable manner whilst safeguarding environmental and social issues for the benefit of the present and future generations. The project will therefore be required to address policy objectives by ensuring that environmental degradation / pollution is minimized during implementation.

3.2.5. National Forestry Policy (2016)

The policy (Government, National Forestry Policy, 2016) aims at promoting sustainable contribution of national forests, woodlands and trees towards improvement of quality of life in the country by conserving the resources for the benefit of the nation and to the satisfaction of diverse and changing needs of Malawi population, particularly the rural communities. The policy prevents unnecessary changes in land-use that promote deforestation or endanger the protection of the forests which have cultural, biodiversity or water catchment values. It also discourages development activities in gazetted forests unless proven to be environmentally friendly for which suitable inter-sectoral and local consultations will be conducted.

Above all, the policy advocates for carrying out an environmental impact assessment where proposed project actions are likely to have significant adverse impacts on important forests and other resources. The developer and the contractor for Benga –Dwangwa (M005 section) 100km road project shall be required to take advantage of provisions under this policy to prevent unnecessary destruction of forests and related resources along the proposed road route.

3.2.6. National Land Policy (2002)

The National Land Policy of 2002 is a principal policy that guides land management and administration issues in Malawi. The policy provides an institutional framework for democratizing land management and outlines procedures for protecting land tenure rights, land-based investments and management of development at all levels. It basically seeks to optimize utilization of Malawi's land resources for development.

The policy recognizes that in order for its provisions to be achieved, there is need to incorporate desirable principles of land use management, effective civic education and public appreciation of the constraints and tradeoffs that need to be made. For example, the choice between having a good road and protecting natural resources must be understood by the public. The objectives of the policy include promotion of tenure reforms that guarantee security and instil confidence and fairness in land transactions e.g. compensation, promotion of a decentralized and transparent land administration and enhancement of conservation and community management of land resources. Chapter 9 of the policy deals with the protection of the environment and land resources. This policy will guide in making important decisions concerning compensations, resettlement and protection of natural resources especially when preparing the Resettlement Action Plan (RAP) for the Road project. During the study, another assessment was carried out by the Departments of land Regional Office, central, to determine the quantity and estimated market value compensations for households that will lose their property and livelihoods due to the construction of the project.

3.2.7. National Gender Policy (2000)

Gender mainstreaming into the social economic development plans is one of the enablers for the sustainable development worldwide. The Malawi Growth and Development Strategy III (MGDS III) and the Millennium Development Goals (MDGs) recognize the importance of gender and women empowerment in socio-economic development.

As stipulated in Section 1.3 of the policy, the national Gender policy provides guidelines for mainstreaming gender in various sectors of the economy to reduce gender inequalities and enhance participation of women, men and youth for sustainable and equitable development; as well as poverty eradication in the country. According to Section 3.6 of the policy, persistent gender inequalities and under-representation of women in decision making positions at all levels, necessitated development and implementation of the gender policy in order to address such gender imbalances and other related issues. The proposed project will economically empower women so as to increase household income resulting in poverty reduction. Increasing women's labour force participation, productivity and earnings will have a direct impact on poverty reduction and stimulate economic growth and development.

Section 3.7 of the policy recognizes that Gender Based Violence (GBV), especially violence against women, girls and the vulnerable groups, is a severe impediment to social well-being and poverty reduction. Eradication of Gender Based Violence is therefore critical for the attainment of national development. The proposed project will ensure and shall put in place plans that will not allow GBV at the project as a work place area. The implementation of the project will therefore consider mainstreaming gender related issues, thereby ensuring that beneficial impacts and adverse impacts affecting women and girls are appropriately enhanced and mitigated against, respectively.

3.2.8. National HIV/AIDS Policy (2012)

The goal of this policy as stated in Section 1.3 is to prevent HIV infections, to reduce vulnerability to HIV, to improve the provision of treatment, care and support for people living with HIV and AIDS, and to mitigate the socio-economic impact of HIV and AIDS on individuals, families, communities and the nation. Chapter 7 of the policy focuses on responding to HIV and AIDS in the Workplace. Section 7.1 points out that the impact of HIV and AIDS in the workplace is increasingly being felt. Among other factors, absenteeism and death result in low productivity, premature payment of employee benefits and low workplace morale. The section also mentions that discrimination against people living with AIDS has also been perpetuated through practices such as pre-employment HIV testing,

dismissal as a result of being HIV positive and the denial of employee benefits if known to be infected.

The policy emphasizes prevention, treatment, care, support and impact mitigation as mutually reinforcing elements and a continuum of an effective response to HIV/AIDS. The proposed project shall endeavour at reducing and managing the impact of HIV and AIDS in the workplace through implementation of an HIV and AIDS policy and a prevention, treatment, care and support programme. Furthermore, the proposed project shall ensure that no person undergoes testing for HIV as a precondition for employment and no person shall be denied employment solely on the basis of HIV serostatus. The management shall not force its employees or members to disclose their HIV serostatus but where an employee or member chooses to voluntarily disclose his or her HIV serostatus, such information shall not be disclosed to others without that employee's or members express written consent.

The road projects will likely bring additional workers to the project sites. An implication from migrant workers is that some migrant workers would be at increased likelihood of contracting HIV and AIDS in the project area. In order to minimize risks, this study recommends Periodic distribution (and training in use) of condoms to workers at the roads, Periodic HIV and Aids sensitization meetings for workers and their spouses, and Development of HIV and AIDS Work Place Policy for the project.

3.2.9. National Water Policy (2005)

The policy in its aims at providing comprehensive and integrated water resources conservation and management in Malawi. The overall policy goal is sustainable management and utilization of water resources in order to:

- ✓ Provide water of acceptable quality and of enough quantities;
- ✓ Ensure availability of efficient and effective water and sanitation services that satisfy the basic requirements of every Malawian;
- ✓ Enhance the country's natural ecosystems; and

- ✓ One of the objectives of the policy is promotion of public and private sector participation in water resources management, development, supply and conservation.

The Section 1.3 of the policy points that after realising the challenges, threats and opportunities associated with implementation of activities in water and sanitation sector, the GoM through the Ministry responsible for Water Development established the policy tailored at tackling any issues in the sector in integrated manner, through involvement of all concerned stakeholders including communities.

The Policy comprehensively covers areas of water resource management and development, water quality and pollution control, and water utilisation. In section 3.4.9 the policy stresses that pollution control of water resources shall adopt the 'Polluter-Pays' principle in order to ensure water user responsibility. Section 5 of the policy also points that surface and ground water quality has been negatively affected by environmental degradation among other factors. Therefore, the road project shall promote the strategies stipulated in the policy with specific effort placed on the following strategies:

- ✓ Section 5.2.2 – Ensuring and promoting proper management and disposal of wastes;
- ✓ Section 5.2.5 – Promoting public awareness on guidelines and standards on water quality, public health and hygiene and pollution control mechanisms; and
- ✓ Section 5.2.6 – Strengthening of institutional arrangements for environmental management.

The principles that will guide the implementation of the road project in relation to the policy include the following:

- ✓ Management, protection and conservation of water resources to be undertaken in an integrated manner;
- ✓ All people to have access to potable water and sanitation services in order to reduce incidences of water related diseases;
- ✓ Water resources shall be optimally, equitable and rationally allocated and regulated to ensure sustainable optimal economic returns and social enhancement;

- ✓ Water resources management will be based on the concept of decentralization and will promote local participation with the catchment as the unit of water management;
- ✓ Promote the empowerment of user communities to own, manage and invest in water resources development; and
- ✓ Pollution of water resources shall follow the “Polluter Pays” principle in order to ensure water user responsibility.

Activities of the road project will likely affect water pipes which will potential negative impacts on the domestic water supply. It is therefore recommended that implementation of the activities of the proposed project should minimize pollution of the public water thereby promoting public health and hygiene and environmental sustainability.

3.2.10. National Sanitation Policy (2006)

The National Sanitation Policy provides a vehicle to transform the hygiene and sanitation situation in Malawi. Section 1.2 of the policy mentions that it provides both guidelines and an action plan where, by 2020, all the people of Malawi will have access to improved sanitation, safe hygienic behaviour will be the norm and recycling of solid and liquid waste will be widely practiced leading to healthier living conditions, a better environment and a new way for sustainable wealth creation. One of the policy objectives as highlighted in section 3.1.1 is the improvement of hygiene, sanitation and recycling of waste in the country. The rehabilitation of Benga – Dwangwa road project will, as such, ensure that liquid and solid waste management encourages the reduction, recycling and reuse of waste before final disposal hence complying with the provisions of the policy.

3.2.11. National Tourism Policy

The main objective of the National Tourism Policy is to optimize the contribution of the tourism sector to national income, employment and foreign exchange earnings. The policy encourages the creation of an enabling environment for private sector involvement in the industry, community participation and enhancing the role of the public sector in facilitating sustainable tourism development. The policy sees tourism as one avenue towards diversifying economic activities from agriculture and poverty reduction. Some of the

project are tourism resort areas outlined in the policy include Lake Malawi and its Islands and Nkhosha National Park. The policy identified inadequate infrastructure as one of the obstacles hampering the development of the tourism industry in Malawi. Hence the rehabilitation of the Benga –Dwangwa Road will contribute significantly towards improvement of the needed tourism infrastructure.

3.2.12. National Decentralization Policy (1998)

The national decentralization policy was approved in October 1998. The policy devolves administrative and political authority to the district level and integrates governmental agencies at the district and local levels into a single administrative unit. The highest administrative and political institution at district level is termed the District Council and is comprised of elected members with full executive powers and non-voting traditional and political leaders. The policy mandates local governments to regulate planning and development within their jurisdiction and also empowers them to have by-laws that specify among other issues, how specific development projects should minimise or avoid environmental degradation. The Benga – Songwe (M005) Road will have to fulfil the planning requirements of the relevant local authority.

3.3. Legal Framework

3.3.1. Environment Management Act (2017)

The Environment Management Act (EMA) of 2017 is the overarching legal framework on environmental management in Malawi, and emanated from the Malawi National Environmental Policy (NEP) which was approved by the Government in 1996 and revised in 2004. The EMA provides for the protection and sound management of the environment, and conservation and sustainable utilization of natural resources.

Section 24 of the Act outlines the ESIA processes to be followed in Malawi and requires that all project developers in both the public and private sectors comply with the process. The “Prescribed List for which ESIA is Mandatory” that is gazette under section 24 of the Act, sets out which activities must have an ESIA before they can be implemented. If a developer is proposing a “prescribed project”, ESIA applies, and the developer needs to

submit a project brief. With respect to roads sector activities, construction of new or expansion of existing highways and feeder roads require an ESIA. Activities associated with road works – quarrying and mining for aggregate material, for example, are also prescribed activities. Furthermore, projects that have the potential to affect national parks, water resources, cemeteries and historical sites (among other screening criteria) also require ESIA. The Act under section 26 (3) further requires that no licensing authority issues any license for a project for which an ESIA is required unless the Director General for MEPA has given consent to proceed due to completion and approval of a satisfactory ESIA report or due to non- requirement of an ESIA. Prescribed activities for which ESIA is mandatory are outlined in the Guidelines for ESIA (1997). In accordance with the prescribed activities, the construction of the Benga – Dwangwas (M005) Road requires an ESIA before it can be implemented hence this report.

Chapter 27 of EMA further provides the legal mandate to the Director General for Malawi Environmental Protection Authority (MEPA) to cause the periodic environmental management systems of any project to enforce Environment Management Act. The Act further requires that proponents must take all reasonable measure to identify and mitigate the undesirable effects arising from implementation of the projects. This study was therefore undertaken by the proponent to meet the prerequisite as directed by the Director General of MEPA in as outlined in this instrument so that the negative impacts are identified and mitigation measures proposed.

3.3.2. Water Resources Act (2013)

The Water Resources Act provides the legal and administrative framework for the protection of water resources from pollution, degradation and depletion. The Act also provides for the control, conservation, apportionment and use of water resources of Malawi. The Act vests ownership of all public water in the President while the control of all public water is vested in the Minister responsible for water affairs. The Act 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. Thus the project shall comply with this requirement by obtaining the necessary water user rights. The Act further prohibits any person to interfere, alter the flow of or pollute or foul any public water. Non-compliance

is an offence. This Act is relevant to the road project as water will be needed for construction work during implementation of the project and the developer and contractor should be aware of the provisions of this Act. The Benga – Dwangwa (M005) Road project will put in place measures to prevent altering of flow or pollution of public water and prevent illegal water obstruction and depletion. The measures to be put in place will be outlined in the environmental management plan as part of the ESIA.

3.3.3. The Land Act (2016)

The Land Act, 2016, which repealed the Land Act of 1965, is the principal legislation dealing with land tenure, land use and land transfer. The Commissioner of Lands is responsible for the administration of the Act. Section 7 of the Act recognizes two categories of land namely; public land and private land. Public land is defined as land as held in trust for the people of Malawi and managed by Government, a local government authority and a Traditional Authority. Private land is defined as all land which is owned, held or occupied under a freehold title, leasehold title or as a customary estate or which is registered as private land under the Registered Land Act. The Act recognizes that every person has a natural dependency on land and that it is therefore important that Government provides for secure and equitable access to land as a multipurpose resource and an economic asset by defining issues of security of tenure.

The Land Act outlines some procedures to be followed for land acquisition by individuals or Government including issuance of formal notices to persons with existing land interests to payment of compensation however most provisions relating to acquisition of land are in the Land Acquisition Act as amended. The Act has some implications on the proposed project considering that the proposed project will cause loss of property and business and will also cause some displacement of people and their businesses. As a result, issues of compensation will arise.

3.3.4. Lands Acquisition Act (1979) and Lands Acquisition (Amendment) Act (2017)

The Lands Acquisition Act No. 21 of 1979 was enacted to provide for the acquisition of land. The Lands Acquisition (Amendment) Act No. 9 of 2017 has amended some provisions

of the Lands Acquisition Act. The main provision being that the Amendment Act now provides for the acquisition and compensation of land in the citation.

Section 3 of the Act read with the Amendment Act Empowers the Minister responsible for lands whenever he/she is of the opinion that it is desirable or expedient in the interest of Malawi, to acquire land for public utility, either compulsorily or by agreement, and pay compensation as may be agreed or determined under the Act.

Sections 5-7 of the Act provide for the issuance of notices upon the persons who are possessed of an interest in the land. According to section 12 of the Amended Act, when a notice to acquire land has been issued and published, the land shall revert to Government as public land within 2 months of the publication of the notice.

Section 9 as amended provides for the payment of compensation. It provides that where any land is acquired by the Minister under this Act the Minister shall pay in respect thereof appropriate compensation agreed or determined in accordance with the provisions of this Act. The Amendment Act further provides that compensation shall be paid in one lump sum; therefore, the assumption is that compensation shall only be monetary, which is in line with the proposed project.

Amended provisions relating to assessment of appropriate compensation provide that an assessment is to be done by an independent valuer appointed by the Minister, unless the parties agree otherwise. The Amendment to the Act also provides information on the grounds on which compensation can be calculated which include; loss of occupational rights, loss of land, costs of professional advice and disturbances which are a natural and reasonable consequence of the disposition of land. The Amendment has inserted substantive provisions on matters to be taken into consideration in assessing compensation for alienated land under section 10A.

Section 11 of the Act deals with the effect of payment of compensation and states that a person who has been paid compensation for land cannot make further claims in respect of the land. However, this does not prevent any subsequent proceedings against the person

to whom the same was awarded by any person claiming to have a better right to the compensation or the right to a share thereof.

The Act has some implications on the proposed project considering that the proposed project will cause land and property loss and disturbance of some businesses and livelihood. As a result, issues of compensation will arise.

3.3.5. The Physical Planning Act (2016)

The Act repeals the Town and Country Planning Act. It provides for physical planning and the orderly and progressive development of land in both rural and urban areas and for issues relating to the grant of permission to develop land and for other powers of control over use of land. The Act is administered by the Commissioner for Physical Planning and provides for the establishment of the Physical Planning Council. The Act provides for development permission including application forms, processing and revocation. Section 54 provides that a person shall not commence the development of any subdivision of any land unless he first obtains a grant of development permission. In addition, a person applying for the registration of any land under the Registered Land Act must attach a copy of the grant of development permission for his documents to be considered.

Part VII of the Act deals with acquisition of land and compensation. The section provides that the Minister may acquire any land, either compulsorily or by agreement if it considered desirable or expedient in the interests of the implementation of any plan of the proper control and furtherance of development of any land under the Act. Compensation will be paid in accordance with the Lands Acquisition Act as amended. Section 68 of the Act provides for occasions when compensation is payable for planning actions, section 69 deals with how compensation can be assessed and section 70 provides for how a claim for compensation can be made. The Second Schedule of the Act is on the calculation of compensation under section 68.

The Act provides for circumstances when an appeal can be made and the fact that an appeal can be made to the Council. A person aggrieved by a decision of the Council may apply to the High Court for judicial review.

3.3.6. The Customary Land Act (2016)

The Act provides for the management and administration of traditional land. In the Act, customary land consists of; land within the boundaries of a Traditional Land Management Area other than Government or reserved land, land designated as customary land under the Land Act of 2016, land, the boundaries of which have been demarcated as traditional land under any written law or administrative procedure in force at the time before the Act came into operation and land the boundaries of which have been agreed upon by a land committee claiming jurisdiction over that land.

As the proposed project may require land for expansion of the road carriageway and diversions, the developer will be required to compensate the landowners in case where the project used extra land out of the road reserve. The extra land that the project will require belongs to individuals who use it for different livelihoods.

3.3.7. Forestry Act (1997) and Forest Amendment Act (2017)

The Forestry policy is embodied in the Forest Act of 1997, and now the Forest Amendment Act, 2017. The purposes of this Act and are more relevant to the proposed Benga – Dwangwa road project. Some of these objectives of the Forestry Act are as follows:

- a) to identify and manage areas permanent forest cover as protection or production forest in order to maintain environmental stability; to prevent resource degradation and to increase social and economic benefits;
- b) to augment, protect and manage trees and forest on customary land in order to meet basic fuelwood and forest produce needs of local communities and for the conservation of soil and water;
- c) to promote community involvement in the conservation of trees and forests in forest reserves and protected forest areas in accordance with the provisions of this Act;
- d) to protect fragile areas such as steep slopes, river banks, water catchment and to conserve and enhance biodiversity;

The Act stipulates that any person who or community which protects a tree or forest, whether planted or naturally growing in any land which that person or community is entitled to use, shall acquire and retain the ownership of the forest with the right to sustainable harvest and disposal of the produce. The Act prohibits the lighting of fires in any forest reserve or protected forest area except in designated areas. Any person who lights a fire in or near a forest reserve, protected area or village forest area shall take all necessary precautions to prevent the fires getting out of control and shall be liable for any damage to the forest caused by any failure to take precautions. The Act also prohibits possession or use within any forest reserve or protected forest area any weapon, trap, explosive, poison or hunting animals as doing so shall constitute an offence. The Act also restricts the following activities unless with a license:

- ✓ To deposit litter or noxious waste in the forest reserve, protected area or village forest area
- ✓ The cutting, taking, felling, destroying, uprooting collection and removal of forest produce from a forest reserve, customary land, public land and protected forest area.
- ✓ The cultivation of crops, grazing of livestock, clearing of land, digging or breaking up land for any road or for any purpose whatsoever on such area of the forest reserve and protected area
- ✓ Squatting, residing, erection of any building, livestock enclosures or any structure in a forest reserve and protected area
- ✓ Prospecting for and extraction of minerals in a forest reserve and protected area.

The restrictions pronounced in the Forestry Act will inform the developer, contractor and Consultants when planning activities for the proposed road project. For example, the Act informs recommendations on the location of contractor work camps. The road construction project will have to undertake measures to protect trees within the road alignment and reserve and limit the cutting down of trees to where it is absolutely necessary in necessary in consultation with relevant authorities and communities.

Additionally, the project is likely to attract an influx of people including those of the contractor's workforce as well as those looking for business opportunities. These people

will increase the demand on forest resources in the areas as the road passes through Nkhotakota forest reserve. Moreover, Road straightening and widening will result into cutting down of trees and loss of biodiversity. In this case and for this project therefore, the application of Forest Act statutes is very important for purposes of maintaining environmental stability; to prevent resource degradation and to increase social and economic benefits as the Act entails. The proposed project implementation has to identify all fragile areas including steep slopes, river banks, water catchment so as to conserve and enhance biodiversity as well as protecting these from degradation. This is a requirement of the Act and ESIA study was conducted to ensure that these attributes of the forestry act, are embedded in the implementation plan to ensure that forest and biodiversity conservation measures are factored into the project.

3.3.8. National Parks and Wildlife Act (2000)

The Act deals with protection and sustainable management of wildlife in Malawi. The Act prescribes the purposes and functions of National Parks and Wildlife Reserves and advocates the concept of a “wildlife impact assessment” before any activity can be carried out in these protected areas. The provisions of this Act must therefore be strictly observed by the contractor as a section of the road to be upgraded passes through the Nkhotakota Wildlife Reserve around Bua River.

3.3.9. Water Works Act (1995)

The Act (Cap. 72:01) was enacted to provide for the establishment of the Water Boards and Water-areas; administration of such areas and development, maintenance and operation of water works. Section 3 establishes Water Boards for five areas including Central Region Water Board (CRWB). The Act makes it an offence if any person wilfully and negligently causes water pollution. The Act also empowers water boards to make bye-laws for regulation of water use and prevention of pollution.

The project will take due consideration for protection of the CRWB water retaining infrastructure against siltation, pollution and damage. A consultation meeting was held with Nkhotakota Scheme Manager of CRWB to map out strategies for protection of the

water extraction points and water pipelines running along the road. Central Region Water Board has water pipelines on both sides and across the project road at Nkhotakota Town and Dwangwa TC. During widening of the road there will be need to relocate such pipes to sites further from the road as these could be disturbed and could lead to water losses for CRWB and interruptions in supply to customers. However, this problem can be minimized if planned in advance to relocate such pipes.

3.3.10. The Public Roads Act (1962) and the Public Roads Amendment Act (2017)

The Public Roads Act of 1962 as amended was enacted to consolidate and amend the law relating to Public Roads. In this Act the highway authority is assigned responsibilities for the construction, care and maintenance of any road or class of road in accordance with the Act.

The Public Roads Act provides for various instances when compensation may or may not be paid. Sections 44-50 of the Act provide for issues relating to compensation including assessment of compensation generally and for surface rights, compensation for land which becomes public land, matters to be taken into consideration in assessing compensation for alienated land and claims for compensation. The part also provides for procedures to be followed before a Land Tribunal and the right to apply to the High Court for judicial review if the claimant of highway authority is unhappy with a decision of the Land Tribunal.

Public Roads Act covers the management of road reserves and streets. Transmission and distribution water pipes are permitted within road reserves among other service infrastructure. Land acquisition and resettlement issues are outlined in part II of the act. Section 44 provides assessment of compensations which can be paid under this act. The compensations cover surface and land rights of the owner or occupier of land. Section 45 provides for compensation for conversion of land into public use and the section states specifically that in case of customary land compensation is in respect to disturbance to people, section 49 and section 50 provide opportunities for land owners or occupiers to appeal to the High Court on grievances related to resettlement and compensations

provided for in this act. Contractors must compensate landowners on sites for borrow pits and contractor's camps. The budget must include such costs.

This Act provides for road standards, safety and classification. The road project will fully comply with the provisions of the Act by ensuring that appropriate infrastructure for public safety and road durability are taken into account. Such infrastructure include road signage, packing bays, bridges, road markings, road shoulders, drainage systems, road crossings and junctions, road reserves, vertical and horizontal alignments and others.

3.3.11. The Local Government Act (1998) and the Local Government (Amendment) Act (2017)

The Local Government Act, 1998 consolidates the law relating to local government. The proposed project falls under the local councils. The Act was enacted to further democratic principles, accountability, transparency and participation of the Malawian people in the decision making and development process. The Act provides legal mandate to local councils in planning, administration and implementation of various development programmes in their respective districts. Section 2 (second schedule) of the Environment Management Act provides functions of the councils in environmental management. The construction works for Benga – Dwangwa road will generate both solid and liquid waste. Hence there is need for the developer to work with district councils in making sure this developmental activity materializes including in waste management and disposal in all the project areas, in line with the provisions of the Act.

In addition, all property owners have to be enumerated, their property assessed and will be compensated according to the Act and RAP for the proposed Benga – dwangwa road project has to be prepared.

3.3.12. Occupational Safety, Health and Welfare Act (1997)

The Occupational Safety, Health and Welfare Act (1997) makes provision for the regulation of the conditions of employment in workplaces as regards the safety, health and welfare of persons employed therein; for the inspection of certain plant and machinery, and the

prevention and regulation of accidents occurring to persons. The Act also places a duty of care on contractors throughout the project and similarly, the workers have a duty to take reasonable care of their own safety and health (Section 5). The developer will have to ensure that there is adequate protection for the workers who will be on site as required by the law.

The Occupational Safety, Health and Welfare Act is important in safeguarding the health and welfare of all workers. The developer will have to ensure that there is adequate protection for the workers who will be on site as required by the Act. To comply with the requirements of the Act, the developer will develop and implement an Occupational Health and Safety Plan to protect workers. Workers have to be provided with appropriate protective clothing where they will be exposed to injurious and offensive substances as required by the Act (Section 58, 59, 60). Additionally, safety aspects have to include establishing environmental and occupational, health and safety policies, COVID 19 Policies and HIV & AIDS policy, as such it can be recommended in this report that the project implementing authority should develop these policies with the guidance of the ministry of Labour and conduct awareness campaigns before recommencement of construction activities.

3.3.13. Public Health Act (1941)

The Public Health Act provides legal framework on planning and management of a wide range of health-related issues including environmental health, occupational health and solid wastes management. The Act requires developers to provide sanitary and health facilities in workplaces to promote health and well-being of the primary occupants and to avoid harmful effects of waste on public health. The assessment recognizes the importance of practicing improved hygiene and use of improved sanitary facilities for sustainable livelihood. This is further elaborated in Occupational and Health Act of 1993. Section 14 where the employee has to take responsibilities during work time to prevent risks of injury or inhalation of hazardous substances and (25) where the employer is given full responsibilities of reducing risks to injury and diseases.

The developer will comply with the requirements of this Act by constructing sanitary facilities and waste disposal facilities and will ensure good hygiene practices during project construction phase, some of which have been mainstreamed in the Environmental and Social Management Plans (ESMPs). In addition, the contractors will have to construct temporary toilets for both female and male workers during construction period.

3.3.14. HIV and AIDS (Prevention and Management) Act (2018)

The HIV and AIDS (Prevention and Management) Act makes provision for the prevention and management of HIV and AIDS; provisions for the rights and obligations of persons living with HIV or affected by HIV and AIDS; provisions for the establishment of the National AIDS Commission; and provisions for matters incidental thereto or connected therewith. Part 4, Section 6 (1) states that discrimination on a basis related to HIV or AIDS is prohibited. Part 5, Section 9 (1) states that a person living with HIV has the right to privacy and confidentiality with regard to information concerning their status. Part 8 of this Act gives provisions to employers by stipulating requirements in several sections quoted as follows:

- ✓ *Section 26 states that an employer shall not require any person to undergo HIV testing as a pre-condition for recruitment;*
- ✓ *Section 27 (1) states that an employer shall not terminate the employment of an employee solely on the ground that the employee is living with HIV or is perceived to be living with HIV;*
- ✓ *Section 28 (1) states that an employee shall not be discriminated against or be subjected to unfair treatment solely on the ground that he is perceived to be or is living with HIV; and*
- ✓ *Section 32 (1) states that the State shall ensure that employers adopt and implement an HIV and AIDS policy at the workplace.*

The implications to Bwenga – dwangwa road is to ensure that HIV and AIDS intervention measures are put in place that responds to the requirements of the Act. The project will need to have an HIV and AIDS policy as a guide to implementing the interventions.

3.3.15. Environment Management (Waste Management and Sanitation) Regulations (2008)

The Environment Management (Waste Management and Sanitation) Regulations of 2008 specifies the role of the local authorities in waste management and sanitation. The regulations also provide for the: management of general or municipal solid waste; solid waste recycling and recycling facilities; management of municipal liquid waste; management of hazardous waste; transporting and storage of waste; waste disposal site or plant and the transboundary movement of wastes. Part II of the Regulations gives the power to the Local Authorities to promote colour coding of waste containers by waste type.

The implication is that Benga – Dwangwa road project has a role to fully recognise, cooperate and collaborate with Nkhotakota District Council in the management of the wastes and sanitation at their site.

3.3.16. Environment Management (Chemicals and Toxic Substances Management) Regulations, 2008

The Environment Management (Chemicals and Toxic Substances Management) Regulations of 2008 outlines provisions for management of chemicals and toxic substances in Malawi including notification and prior informed consent procedures. Part I, Section 3(1) of the regulation mention application by stating that *“these Regulations apply to any person in Malawi whose undertaking involves or includes the manufacturing, repackaging, importation, exportation, transportation, distribution, sale or other mode of handling toxic substances and chemicals and in respect of any activity in relation to toxic substances and chemicals which involves a risk of harm to human health or the environment.”* Part II, section 4, (1) (a) of the Regulations states that “No person shall engage in the business of manufacturing, repackaging, importing, exporting, transporting, distributing, sale or other mode of handling chemicals and toxic substances without a licence issued by the Director General for MEPA in the prescribed form.

Section 26 stipulates regulations regarding treating of chemical wastes and requires that no industry shall discharge any chemical wastes in any state into the environment unless such

wastes have been treated in accordance with acceptable international methods that are approved by the Director in consultation with the relevant local authority. The road project maybe handling and storing hazardous materials and chemicals. This implies the need for the road project to obtain transporting, handling and storage licences of chemical and toxic substances from the Director General for MEPA.

The proposed Benga – Dwangwa road project will use anti-termite chemicals and as such the contractor shall have to abide by this Act.

3.3.17. Gender Equality Act (2013)

The Act was developed to ensure that men, women, boys and girls equally and effectively participate in and benefit from. Different development processes. The Act was put in place to assist to:

- a) Promote gender equality, equal integration, influence, empowerment, dignity and opportunities for men and women in all functions of society;
- b) Prohibit and provide redress for sex discrimination, harmful practices and sexual harassment; and
- c) Provide for public awareness on promotion of gender equality.

The Act applies to all persons and to all matters. This means it will apply to private and public institutions; including religious settings and chiefs. It also applies to the government. It affects all aspects of life in Malawi. The Act in Part 2 prohibits of sexual discrimination and harmful social or cultural practices; Section 7 calls for all work place policy to ensure that sexual harassment is avoided. Benga – Dwangwa road project is as such obligated to ensure these principles are included in all its activities specifically in relation to membership and providing a conducive environment without sexual harassment and any other types of gender discrimination.

Considering that the project will employ several people both during construction and operation phases of the project, both the Developer and the Contractor will be expected to apply provisions of this Act. The project will ensure that wherever there are any employment opportunities, 40% of the employees shall be women.

3.3.18. Monuments and Relics Act (1995)

The act provides for protection, rescue of archaeological and relics or any other items of archaeological value that and that Archaeological permit shall be obtained where applicable for the excavation of monuments and relics. No person shall without the prior written consent of the Minister—make any alteration to, or destroy or damage, any monument or relic or any part thereof; or carry out any cultivation or mining project or other work so as to cause, or likely to cause, damage or disturbance to any protected monument or protected relic. A person in charge of any survey, excavation, exploration, construction or new development shall, at the earliest stages of planning for such activities, give notice to the Minister to enable, where necessary, rescue archaeology.

The Act further stipulates the proper management and conservation of monuments that are of importance both nationally and locally. It also provides for proper preservation of monuments if there is a change in the use or development of land. This gives room for the authorities for monuments and relics to protect monuments under the provisions of the Land Act or the Lands Acquisition Act.

Some areas of the road pass near graveyards. Graveyards link the present generation to their past and are regarded with high respect in many cultures in Malawi. The project activities will ensure that graveyards will not be affected by rehabilitation of the road project as the alignment will be deviated away from the graveyards.

3.4. Relevant African Development Bank Safeguards Policies

The proposed rehabilitation works for Benga – Dwangwa M005 road section project will trigger four of the African Development Bank's Safeguard Policies, namely: OS1 – Environmental and Social Assessment; OS3 – Biodiversity, Renewable Resources and Ecosystem Services; OS4 – Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency; and OS – 5 Labour Conditions, Health and Safety. These policies are summarized as follows:

3.4.1. Environmental and Social Assessment (OS 1)

This is the overarching safeguard; whose main objective is to mainstream environmental and social considerations (including those related to climate change vulnerability) into the Bank's-financed projects; and thereby contribute to sustainable development in the African Region. The safeguard governs the process of determining a project's environmental and social category and the resulting environmental and social assessment requirements.

The specific objectives are to:

- a) Mainstream environmental, climate change, and social considerations into Country Strategy Papers (CSPs) and Regional Integration Strategy Papers (RISPs);
- b) Identify and assess the environmental and social impacts and risks—including those related to gender, climate change and vulnerability—of Bank lending and grant-financed operations in their areas of influence;
- c) Avoid or, if avoidance is not possible, minimise, mitigate and compensate for adverse impacts on the environment and on affected communities;
- d) Provide for stakeholders' participation during the consultation process so that affected communities and stakeholders have timely access to information in suitable forms about Bank operations, and are consulted meaningfully about issues that may affect them;
- e) Ensure the effective management of environmental and social risks in projects during and after implementation; and
- f) Contribute to strengthening RMC systems for environmental and social risk management.

Within the environmental and social assessment process, all the Banks' projects have to be categorised in one of the four possible categories according to the Initial Environmental and Social Screening Checklist which presents most types of projects that are financed by the Bank's public sector operations and subjected to the Environmental and Social Assessment Procedures.

Category 1 projects are those that likely to have important adverse environmental and/or social impacts that are irreversible, or to significantly affect environmental or social components considered sensitive by the Bank or the borrowing country. These require a full Environmental and Social Impact Assessment (ESIA), including the preparation of an

ESIA Report and Environmental and Social Management Plan (ESMP). These projects may also be improved by carrying out complementary studies that are not specifically required under the ESAP, such as detailed gender analyses or institutional analyses. The need for such complementary studies shall be determined on a project-by-project basis during the preparation phase.

Category 2 projects are likely to have detrimental and site specific environmental and/or social impacts that are less adverse than those of Category 1, as their scale of intervention is less significant. By definition, Category 2 includes projects that can be improved by the application of mitigation measures or the incorporation of internationally recognised design criteria and standards. This Category of projects requires the preparation of an Environmental and Social Management Plan (ESMP). Some Category 2 projects may require detailed studies on certain environmental or social dimensions in order to prepare a comprehensive ESMP. Some projects initially classified in Category 2 shall be upgraded to Category 1 when they have the potential to negatively affect environmentally sensitive areas or socially sensitive issues.

Category 3 projects involve little physical intervention on the environment and shall induce no adverse environmental or social impact. Therefore, these projects require no further environmental or social assessment action. Nevertheless, some social studies may be required for the preparation of such projects. Some projects initially classified in Category 3 shall be upgraded to Category 2 when they involve potential adverse physical intervention in the environment or may be detrimental to women, poor, vulnerable groups or less organized segments of society.

Finally, Category 4 applies to investments of Bank's funds through Financial Intermediaries (FIs). As subprojects financed through FIs may result in adverse environmental or social impacts, they must be screened and managed by FI according to the same procedures as those in application for projects directly financed by the Bank.

The rehabilitation of Benga – Dwangwa M005 road section project is likely to generate negative environmental or social impacts such as, among others, physical disturbance of

the project site and its surroundings, significant migration or displacement of affected populations, significant changes in socio-cultural patterns, adversely affect vulnerable groups, destruction or degradation of substantial biological resources, significant increase in health and safety risks, or major changes in the hydrology or water quality. The project is considered as Category 1, hence, requiring full environmental and social impact assessment as governed by this AfDB safeguard policy. Category 2 investment projects by the bank require the preparation and implementation of an adequate ESMP to manage the associated environmental and social risks in compliance with the Bank's safeguards. Therefore, in line with OS 1, the assessment has been conducted and an ESMP has been prepared to manage the identified environmental and social impacts, which include those related to land, natural habitats, biodiversity, natural resources management such as forests, ecosystem services, gender, climate change and vulnerability, pollution prevention and abatement, resource efficiency, disability, rights and interest of vulnerable groups, and occupational health and safety.

3.4.2. Involuntary Resettlement, Land Acquisition, Displacement and Compensation (OS 2)

The aim of this OS2 is to facilitate the operationalization of the Bank's 2003 Involuntary Resettlement Policy in the context of the requirements of OS 1 and thereby mainstream resettlement considerations into Bank operations. This OS2 relates to occasions in which a Bank-financed project causes the involuntary resettlement of people. It seeks to ensure that when people must be displaced they are treated fairly, equitably, and in a socially and culturally sensitive manner, that they receive compensation and resettlement assistance so that their standards of living, income earning capacity, production levels and overall means of livelihood remain the same or are improved, and that they share in the benefits of the project that involves their resettlement.

The specific objectives are to:

- a) Avoid involuntary resettlement where feasible, or minimize resettlement impacts where involuntary resettlement is deemed unavoidable after having explored all other alternative project designs;
- b) Ensure that displaced people are meaningfully consulted and given opportunities to participate in the planning and implementation of resettlement programs;

- c) Ensure that displaced people receive significant resettlement assistance under the project, so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved beyond pre-project levels;
- d) Provide explicit guidance to borrowers, with support from relevant Bank staff, on the conditions that need to be met regarding involuntary resettlement issues in Bank operations in order to mitigate the negative impacts of displacement and resettlement, actively facilitate social development and establish a sustainable economy and society; and
- e) Set up a mechanism for monitoring the performance of involuntary resettlement programs in Bank operations and remedying problems as they arise so as to safeguard against ill- prepared and poorly implemented resettlement plans.

The OS2 requires the borrower to consider feasible alternative project designs, including re-siting and re-routing, to avoid or minimize physical or economic displacement, while balancing environmental, social and financial costs and benefits. When the resettlement implications of a project would appear to be particularly severe, the borrower shall consider either downsizing the project to reduce resettlement or finding other alternatives that can reasonably replace the project. For greater transparency and fairness, all stakeholder groups shall be involved as early as possible, at least at the time when the first project plans are drafted and thereafter through implementation. Since dissemination of findings is critical to developing effective measures for mitigating adverse impacts and optimizing benefits, it should be a continuous process incorporating the ongoing learnings from the communities and changes in the conceptual design of the project.

In order to enable access to information early in the design phase to help identify options for avoiding or mitigating adverse impacts that might pose risks to project costs, schedules, and affected people, the borrower shall continuously disseminate project plans and assessment findings to stakeholders. Client shall also involve all stakeholder groups and affected people before completion of the project design and assess and include their inputs so that the project design can be properly altered and ensure that their involvement is continued in the process of monitoring and evaluating resettlement and compensation projects and programs and options assessment.

The rehabilitation of Benga – Dwangwa M005 road section project will likely cause displacement of people. Therefore, in line with OS 2, the RAP has been prepared so that the affected people are treated fairly, equitably, and in a socially and culturally sensitive manner, that they receive compensation and resettlement assistance so that their standards of living, income earning capacity, production levels and overall means of livelihood are improved, and that they share in the benefits of the project that involves their resettlement.

3.4.3. Biodiversity, Renewable Resources and Ecosystem Services (OS 3)

The principal objective of this safeguard is to conserve biological diversity and promote the sustainable use of natural resources. It reflects and reinforces the Bank's commitments to its policy on integrated water resources management and to the UN Convention on Biological Diversity. The safeguard reflects the importance of biodiversity on the African continent and the value of key ecosystems to the population; emphasizing the need to "respect, conserve and maintain the knowledge, innovations and practices of indigenous and local communities and to protect and encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.

The Benga-Dwanga M005 stretch crosses through Nkhotakota Wild Reserve (NWR) from Bua Bridge to a distance of about 5km northwards. Road construction will have significant impacts on the ecosystems and ecosystem services of the project area, with some losses of biodiversity and possible destruction of natural habitats and forests especially the road stretch within NWR around Bua River. Road straightening and widening will result into cutting down of trees and loss of biodiversity. Additionally, the project is likely to attract an influx of people including those of the contractor's workforce as well as those looking for business opportunities. These people will increase the demand on forest resources in the areas as the road passes through Nkhotakota forest reserve.

In this case and for this project therefore, the application of policy is very important for purposes of maintaining environmental stability; to prevent resource degradation and to increase social and economic benefits. A number of measures have been proposed in this

ESIA, to ensure that potentially harmful impacts on biodiversity are reduced or possibly avoided where possible and to ensure that the biodiversity and ecosystem restoration activities are effectively implemented for maximum benefits.

3.4.6. Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency (OS 4)

This safeguard outlines the main pollution prevention and control requirements for borrowers or clients to achieve high-quality environmental performance and efficient and sustainable use of natural resources, over the life of a project.

The specific objectives are to:

- a) Manage and reduce pollutants (including hazardous and non-hazardous waste resulting from the project) so that they do not pose harmful risks to human health and the environment; and
- b) Set a framework for efficiently using all of a project's raw materials and natural resources, especially energy and water.

The proposed development is a Category 2 project in terms of climate risk, in accordance with the AfDB's Climate Safeguards Screening. This category requires that the project design and implementation consider adaptation and mitigation measures to increase the resilience of the communities and infrastructure from the effects of climate change in the project area. Construction works for the project will lead to the release of pollutants into the environment in the area. Mitigation measures have been proposed through this ESMP for the protection of natural resources including water and air from possible pollution agents such as oil spillages, silts, dust and exhaust fumes due to the proposed construction activities.

3.4.7. Labour Conditions, Health and Safety (OS 5)

This safeguard establishes the Bank's requirements for its borrowers or clients concerning workers' conditions, rights and protection from abuse or exploitation. It covers issues concerning working conditions, workers' organizations, occupational health and safety and avoidance of child or forced labour. The main aim of the safeguard is to ensure the protection of rights of workers and respect of the workforce, resulting into increased

productivity. It also seeks to promote compliance with national legal requirements and provide supplemental due diligence requirements where national laws are silent or inconsistent with the safeguard.

Various Occupational Safety and Health issues will be encountered during implementation of the project. Hence responsible authorities must ensure that OSH requirements are adhered to at all times, according to the policy as well as the national Occupational Safety and Health Act. This ESIA has outlined some occupational safety and health interventions that will be required for implementation and monitoring during the lifespan of the project.

3.4.8. Gender strategy of the African Development Bank

The AfDB intervention at the country level focuses on three key areas – agriculture and rural development, human resource development and private sector development. The Bank has also identified governance, economic integration and co-operation, environment and gender as additional key areas of intervention. The Bank's policy is to guarantee that in each of the three broad sectoral areas, environment and gender issues are mainstreamed in a fully participatory manner. In this case, the AfDB ensures that:

- (i) The environmental and gender implications of the Bank's activities are taken into account from the early stages of planning and decision-making;
- (ii) Environmental and gender issues are properly reflected in the preparation, approval, implementation, and evaluation of all types of financing by the Bank Group; and
- (iii) Capacity building and training efforts are enhanced in the Bank's investments.

3.5. Gap Analysis between National Law and the Bank's Policy

Policies of the AfDB and Government of Malawi (GoM), particularly on resettlement have several common aspects. For example, both policies emphasise on minimisation of the extent of resettlement. Secondly, the policy recommends considerations of fair and adequate compensations to project affected persons. There are no fundamental differences on the National Policy for the ESIA and the OS 1. While environmental screening is mandatory under OS 1, the national policy has a prescribe list of projects that have to undergo 93inimize9393tal and social assessments. Further to this, the national law does

not obligate the Contractor to develop specific management plans for specific project activities but rather have these incorporated in the ESMP of the entire project.

However, there are some gaps which exist between the policies of AfDB and those of Government of Republic of Malawi. A detailed comparative analysis is provided in *Table 6* Some selected examples are as follows:

- i. Under OS2 – Involuntary Resettlement, Land Acquisition, Displacement and Compensation, displaced persons are classified into the three groups. Land owners, are among the PAPs who are entitled to full, fair and prompt compensation as well as other relocation assistance. In addition, where displaced persons have no recognizable legal rights, they are to be provided with resettlement assistance in lieu of compensation for the land they occupy, as well as other assistance. Under Malawi law, land owners are entitled to a full compensation and those with no recognizable legal rights are not entitled to compensation. Nevertheless, they will be given compensation for the investment they made on the land.
- ii. On aspects of compensations on land, the policies of GoM consider the different intrinsic values associated with various classes of land (customary land, leasehold land, freehold land, public land). In such cases, rates for compensation on land vary from one site to another and from one class of land tenure to the other. The AfDB policies do not distinguish such differential aspects of land classes and corresponding different market rates and instead insist on full replacement cost of the land regardless of its type.
- iii. In cases on compensation of loss of land by project affected people, the AfDB policies prefer land for land compensation. In Malawi an option of land for land compensation is normally preferred in customary land transaction while option of land for money compensation is the preferred options in urban areas.
- iv. AfDB's policy clearly stipulate resettlement as an upfront project in that all issues of land acquisition and relocation of project affected people must be done prior to commencement of the project site on the acquired site. Malawian policies do not clearly spell out this approach and in practice; resettlement is treated as a separate exercise outside project planning and implementation.

- v. AfDB's policy clearly recommends for adequate resettlement assistance and rehabilitation assistance to relocated people as a way of restoring and enhancing socio-economic living standards. This is supposed to be undertaken within the first years of relocation on the new sites. Malawi legislation does not clearly define the extent of resettlement assistance to relocated people. Much of available support is normally left in hands of District Commissioner and local chiefs within the district and area of relocation of the project affected people.

Table – 6: Measures to be applied in addressing the Legislation –Policy Conflict

African Development Bank's Safeguard Policies,	Law & Regulations of Government of Malawi	Countermeasures for filling gaps Appropriate measures for addressing the gap
<p>OS1 – Environmental and Social Assessment</p> <p>This safeguard gives guidance to the overall process of ESIA and sets the scope of the ESIA process for AfDB funded projects including project categorization based on the receiving environment its level of sensitivity and nature of potential impacts.</p>	<p>Environment Management Act</p> <p>Section 24 of the Act outlines the ESIA process to be followed in Malawi and requires that project developers in both the public and private sectors comply with the process. The “Prescribed List for which ESIA is Mandatory” that is gazetted under section 24 of the Act, sets out where activities must have an ESIA before they can be implemented. With respect to roads section 24 activities, construction of new or expansion of existing highways and feeder roads require ESIA. Activities associated with road works such as quarrying and mining for aggregate material, for example, are also prescribed activities.</p>	<p>This ESIA was guided by the objective of defining the receiving environment, the proposed project activities and the design in order to predict potential impacts such that opportunities to avoid, mitigate and offset negative impacts are determined and subsequently implemented while enhancing the positive impacts.</p> <p>Important to note is that ESIA for Project Associated Facilities such as Quarries, camps and gravel borrow areas among others are yet to be undertaken since the 1996 locations to minimize these facilities are yet to be determined.</p>
<p>OS2 – Involuntary resettlement land acquisition, population displacement and compensation</p> <p>This safeguard makes provisions for ensuring that</p>	<p>Public Roads Act (<i>chapter 69:02</i>)</p> <p>i. The law stipulates payment of cash compensation based on loss or damage or destruction to structures and any for</p>	<p>The proposed project will involve construction of the road which will lead to displacement of people and change of land uses especially where there are business communities and agriculture</p>

African Development Bank's Safeguard Policies,	Law & Regulations of Government of Malawi	Countermeasures for filling gaps Appropriate measures for addressing the gap
<p>the process of acquiring land for the project, affected persons are not left worse-off than before project. It seeks to ensure that when people are to be displaced, they are treated fairly, equitably, and in a socially and culturally sensitive manner; that they receive compensation and resettlement assistance so that their standards of living, income-earning capacity, production levels and overall means of livelihood are improved; and that they share in the benefits of the project.</p>	<p>of properties. No compensation on land acquired for public purposes.</p> <p>ii. The law stipulates that land owners are entitled to reasonable compensation offered by government on customary land.</p> <p>iii. The law stipulates that no compensation is payable for improvements on land within road reserves (section 44)</p> <p>iv. The law stipulates that no compensation is payable to squatters unless they occupy the land continuously for a period of more than 7 years</p> <p>Land Acquisition Act (<i>Chapter 57:04</i>)</p> <p>v. The law stipulates that compensation is based on assessment done by government and agreed by parties.</p> <p>vi. The law stipulates that compensation is given when land is acquired.</p> <p>vii. The law stipulates that compensation not to exceed market value.</p>	<p>activities leading to potential loss of livelihoods. Therefore, this OS has been triggered.</p> <p>A Resettlement Action Plan (RAP) has been prepared following a meaningful stakeholder consultative process as guided by this OS. The RAP outlines measures to avoid and minimize adverse impacts during the process of land acquisition and involuntary resettlement.</p>

African Development Bank's Safeguard Policies,	Law & Regulations of Government of Malawi	Countermeasures for filling gaps Appropriate measures for addressing the gap
	<p>Land Act (<i>Chapter 57:01</i>)</p> <p>viii. The law stipulates that reasonable cash compensation to loss of affected persons for loss of land.</p> <p>Customary Land Act</p> <p>ix. The law favours land for land compensations.</p>	

3.6. Relevant International Conventions and Agreements Ratified by the Malawi Government

Malawi's Constitution states, that customary international law is part of the laws of the Republic. International agreements require an Act of Parliament to become enforceable under domestic law. The major international agreements to which Malawi is party to include Biodiversity, Climate Change, Endangered Species, Environmental Modification, Hazardous Wastes, Marine Life Conservation, Nuclear Test Ban, and Ozone Layer Protection. The *Table 7* below lists the international conventions and treaties relevant to the Project, which Malawi has accepted or ratified:

Table 7. Relevant international conventions and agreements ratified by the Malawi Government.

Relevant international conventions and agreements ratified by the Malawi Government		
International agreement/Convention	Year of adoption	Objectives
The UN Framework Convention on Climate Change	1994	To achieve stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
The Kyoto Protocol on Climate Change	1997	To fight global warming by reducing greenhouse gas concentration in the atmosphere to a level that would prevent dangerous anthropogenic interference with the climate system.
Convention on Wetland of International Importance Especially as Waterfowl Habitat (The Ramsar Convention)	1975	To ensure conservation and wise use of all wetlands of international importance through local and national actions and international cooperation as a contribution towards achieving sustainable development throughout the world. It was drawn up following recognition that wetland- along with

Relevant international conventions and agreements ratified by the Malawi Government		
International agreement/Convention	Year of adoption	Objectives
		agricultural land and forests are one of the key supporting system on the planet. It also includes the areas around bodies of fresh and salt water.
UN Convention on Biological Biodiversity	1993	To conserve biodiversity; To use biological resources sustainability; To ensure equitable distribution of the benefits of using genetic resources
Dublin Principle- International Conference on Water and Development	1992	Summarises the importance of an integrated approach on water and clearly articulates the link between water resources management and the “3Es” of sustainable development; economic efficiency in water user; social equity and environmental ecological sustainability. This has 4 guiding principles
Agenda 21 UN Conference and Development	1992	Application of the integrated approaches to the development, management and use of water resources.
International Plant Protection Convention	1997	Emphasises cooperation and the exchange of information towards the objective of global harmonisation. In addition to describing national plant protection responsibilities it also addresses important elements of international cooperation for the protection of plant health and establishment and use of international standards for phytosanitary measures.

Relevant international conventions and agreements ratified by the Malawi Government		
International agreement/Convention	Year of adoption	Objectives
African Convention on Conservation of Nature and Natural Resources	2017	Utilisation of natural resources
Convention on International Trade in Endangered Species of Wild Fauna and Flora «CITES»	1973	This convention prohibits local and international trade in endangered species of wild fauna and flora and anyone found doing it shall be prosecuted and given a stiff penalty

3.7. Guidelines

3.7.1. Guidelines for Environmental Impact Assessment (1997)

These guidelines cite and are complementary to the Environmental Management Act of 1997. The guidelines emphasize that in section 26 of the Environmental Management Act a prescribed project cannot receive the required authorisation to proceed from the relevant licensing authorities unless and until the Director General for MEPA has issued a certificate stating that an ESIA is not required or on the basis of an ESIA report he/she has approved. The EIA process requires that a project brief be prepared by the developer and submitted to the Director General for MEPA to determine whether the project under consideration requires an ESIA or not. If an ESIA is required, then the developer prepares and submits the Terms of Reference for the ESIA study for the proposed project to the Director General for MEPA. It is these Terms of Reference that have been forwarded to the Consultant to guide the preparation of this ESIA study.

Once the ESIA report is complete, it should be submitted to the Director General for MEPA for review. The Director is expected to initiate the review process and also refers the ESIA report to the board. The review process could result in three possible outcomes:

- ✓ Recommendation to redesign the project and the ESIA redone
- ✓ Project rejected (as redesigning or detailed ESIA will not solve the anticipated negative impacts to the environment)
- ✓ Approval of the ESIA report.

3.7.2. Environmental and Social Management Guidelines in the road sector (2017)

In response to the requirements of section 24 of Environmental Management Act, Roads Authority developed Environmental and Social Management Guidelines for the road sector in 2007. The guidelines were developed in order to facilitate mainstreaming of environmental and social planning in design and implementation of roads in Malawi. The guidelines are used by project developers, donors and the general public in their project planning processes.

For resettlement of affected communities, the guidelines recommend preparation of a RAP before implementation of any road project. This is consistent with government policy on resettlement and compensations on affected properties.

RAP for the proposed Benga – Dwangwa road project shall be required especially at trading centres. The road shall also take up some land to accommodate the required width and road reserve. The assessment has been conducted by lands department/office which will indicate the types of structures, infrastructures, pieces of land and vegetation to be affected and converted into the current land market value for compensation. The project proponent shall be responsible for compensation.

3.7.3. Covid-19 Workplace Guidelines (2020)

The Ministry of Labour, Skills and Innovation developed these Guidelines with the objectives of mitigating the spread of Corona virus in workplaces; protecting jobs and incomes; safeguarding the health and safety of employees; ensuring business continuity; and promoting innovative business solutions through social dialogue. Specifically, the Guidelines promote the following:

- ✓ *safeguarding the health of the employees and all the people they come into contact with;*
- ✓ *ensuring business continuity in order to protect jobs and sustain the country's economy and*
- ✓ *ensuring availability of social protection measures in the event of job losses. Thus, the Contractor has to ensure that qualified and experienced personnel such as health and safety professionals or safeguards specialists are recruited to enforce these guidelines at the construction site.*

3.7.4. Public Health (Corona Virus and COVID-19) –Prevention, Containment and Management rules

In the wake of the COVID-19 pandemic, the Malawi Government amended the Public Health Act to put forward rules to govern prevention, containment and management of the corona virus. In Part II (General Preventive Measures) of the Rules, Division I deals

with prevention of spread of corona virus by persons whilst Division II stipulates measures by the Government to prevent, contain and manage the spread of COVID-19. Therefore, the project should ensure that these measures are followed both during the construction phase to prevent further spread of the virus amongst the workforce and the general public. This will include provision of soap and handwashing facilities to workers and visitors both construction and operation phase. All workers will be provided with Masks and ensure its use is being enforced.

3.8. Regulatory Licences and Approvals

Regulatory licences and approvals needed for the proposed project to ensure that it is in line with sound environmental and social management practices and is in compliance with relevant existing legislation include those provided in *Table 8*.

Table - 8 Regulatory licenses and approvals relevant for the project.

No	Regulations	Description	Reference	Issuing
	Standards/ Approvals			Institution
1	ESIA approval letter	The letter will be provided after approval of the ESIA	EMA, 2017 and EIA Guidelines 1997	MEPA
2	Workplace Registration Certificate	Every workplace is required to be registered and must commit to abide by all of the country's labour laws	Occupation Safety Health and Welfare Act (1997)	Ministry of Labour & Skills Innovation
3	Water Abstraction Permit	It is a requirement for the project to obtain water abstraction permit for the boreholes	Water Resources Act (2013)	National Water Resources Authority

No	Regulations	Description	Reference	Issuing
	Standards/ Approvals			Institution
4	Planning Permission	It is a requirement for the project to obtain building Plans	The Physical Planning Act No 17 (2016)	Nkhotakota District Council
5	Waste water/Effluent discharge permit			
6	License for storage of hazardous waste			

CHAPTER FOUR: PROJECT ALTERNATIVES

This chapter examines alternatives for either maintaining the existing road or expanding and various technologies to be used during the construction of the project. There are two major options that were considered by the Roads Authority. These are ‘Do nothing option’ and ‘Undertake the road rehabilitation option’. The environmental and social implications of each have been considered in selecting the project option.

4.1. Option 1: Do nothing

In this option it is expected that the RA will continue with routine maintenance activities to keep the road open. RA will repair all the failed sections. With this option it is expected that there is going to be accelerated deterioration of the road where rutting already exceeds 20mm resulting in more failures and possible disruption of access to traffic. Congestion in the trading centres will increase and road safety will worsen.

4.2. Option 2: Undertake the Upgrading of the Road

Under this option the road will be rehabilitated to a carriageway with sealed shoulders at a design speed of 80km per hour and 50 km per hour. In addition to the main Benga-Dwangwa road rehabilitation project, the upgrading of feeder roads connected to the M005 presents another vital aspect of enhancing regional connectivity and accessibility. These feeder roads, while serving as crucial links to communities and economic activities, require careful consideration in terms of their rehabilitation options as follows:

4.2.1. Option 2.1: Patch and reseal

Patch and reseal involves ripping and re-compact the base where rut depth exceeds 10mm and fill other ruts with slurry. Remove accumulated silt along Krebs and reopen chutes. Repair failed sections and reseal with 13 mm Cape seal. Repair road marking and reflective road studs as well as repair Armco barriers or provide new concrete “New Jersey” barriers.

This option is expected to provide additional 10 to 15 years of life to existing pavement but no significant improvement to road safety and congestion in trading centres will increase. There will be need to implement general speed restrictions to 80km with 50km/hour in trading centres in order to reduce congestion and accidents.

4.2.2. Option 2.2: Patch, reseal and widening at trading centres

This option is the same as option 2.1 but the addition is to widen the road in order to provide 7 m carriageway and 2 m sealed shoulders as well as new bus bays in the trading centres. This option can provide additional life expectancy of 10-15 years to the existing pavement and some improvement to the road. Congestion in the trading centres will be reduced thereby improving safety on the road.

4.2.3. Option 2.3: Complete reconstruction and widening with double surface dressing

This option will involve widening the road embankment to provide 7m carriage with 1.5m sealed shoulders throughout and 2m sealed shoulders in trading centres. Bus bays will be constructed in all the trading centres and along the road. The embankment will be raised in line with the hydrological analysis of the area.

- ✓ This option will affect 36% of the road and will involve
- ✓ Ripping the existing base and resurfacing
- ✓ Ripping existing sub-base layer and stabilize as new selected sub-grade of 150mm
- ✓ Reuse the original base material as sub-base 150mm
- ✓ Import new granular base of 150mm

On the remaining 64% of the road, the works will involve:

- ✓ Ripping the existing base and surfacing and re compact as a new sub-base 150mm
- ✓ Import new granular base 150m

There will be need for 19/9.5 double surface dressing and road markings and reflective road studs. There will also be need to repair Armco Barriers or provide new concrete “New Jersey “barriers as well as widening existing walkways on bridges to 1.5m. With this option reseal will only be required after 10-12 years and general speed restrictions will be 100km/hr. and 50km/hr. in trading centres.

This option is expected to provide additional 20 years of more on the life of the road. Road safety is greatly going to improve due to reduced congestions in the trading centres.

4.2.4. Option 2.4: Complete reconstruction with asphalt concrete dressing

Complete reconstruction with asphalt concrete dressing is similar to option 2.3 but in addition will have a 40mm Asphalt surfacing. This option provides low maintenance cost over a period of more than 20 years of the design life of the road. The road surface will be smoother resulting in lower vehicle maintenance costs. There will be need to rejuvenate the spray after 10 years and reseal or overlay after 20 years. General speed restriction of 100km/hr. and 50 km / hr. in trading centres will be imposed. Complete reconstruction with asphalt concrete dressing is therefore considered the best option.

From above, the advantages of rehabilitating the road alternative far outweigh the disadvantages of the “No-Action” alternative. Even though the initial cost of the construction will be high, the accrued benefits to be derived from the “project development alternative” socially, culturally and economically supersede the “No-Action” alternative.

While it was considered that the environmental and social impacts of the considered road design alternatives were not significantly different, Option 2.4 was selected because of its low maintenance cost implications during the 20 year design period. This option will effectively lead to reduced congestion and improved road safety along the trading centres. It also provides for a smooth flow of traffic and the road users.

4.3 Alternative Analysis for Feeder Roads

In consideration of the feeder roads connected to the M005, it's essential to evaluate alternatives that align with the overall objectives of the project while addressing the specific needs of these roads. Given the cost constraints and the need for practical solutions, two primary options are considered for the feeder roads:

4.3.1. Option 1: Basic Maintenance Activities

Similar to Option 2.1 proposed for the main road, this option involves implementing basic maintenance activities such as gravelling or reshaping to address immediate issues with

rutting and surface failures. While cost-effective, this option may provide only temporary improvements and may not fully address underlying infrastructure deficiencies.

4.3.2. Option 2: Comprehensive Upgrades

This option entails more extensive upgrades, including widening the feeder roads and implementing durable surfacing materials. Despite potentially higher initial costs, this approach could lead to long-term benefits such as improved road safety and economic efficiency. However, detailed engineering assessments are necessary to determine the feasibility and cost-effectiveness of this option for each feeder road.

CHAPTER FIVE: ENVIRONMENTAL AND SOCIAL SETTING

This chapter provides an overview of the existing environment for the project related to biophysical, biological, socioeconomic and structure of the proposed areas for the project. It also provides basic baseline information in the project area. The information provides a basis for the changes which might come due to the implementation of the project or future environmental changes which are likely going to occur. It also forms a part of baseline information existing within the project area that might be used for future planning.

Secondary baseline data collected from district council offices was organized according to Extension Planning Areas (EPAs) traversed by the project road. Notably, the road sections passing through Ntosa, Zidyana, and Linga EPAs constitute Phase I of the project, while those passing through Mphonda and Nkhunga EPAs are part of Phase II implementation. Table 9 below illustrates the EPAs associated with feeder roads in alignment with the project's implementation phases:

Table 9. Feeder Roads Alignment with Project Implementation Phases

FEEDER ROAD	EPA
<i>PHASE I</i>	
Kalimanjira (M005) to Chididi Health Centre (1.3Km) and Rajal to Makuzi (6km)	Zidyana
Mwansambo Turnoff (M005) to Kayoyo (9.7km)	Ntosa
Nkhotakota Prison (M18) to 4ways (M005) (2Km)	Linga
4 Ways (M005) to Nkhufi road (M18) (3Km)	Linga
Nkhufi road (M18) to Nkhotakota LEA School (M005) (1.8Km)	Linga
M18 Bishop Road to M005 (1.0 Km)	Linga
Nkhotakota LEA School (M005) to Nkhotakota Police Station M (0.8Km)	Linga
Nkhotakota LEA School (M005) to Nkhotakota Police Station (M18) (0.6Km)	Linga
Mount Meru filling Station (M18) to Airport (M005) (0.8km)	Linga
<i>PHASE II</i>	
Kaombe to Roadblock (M005) to Mphangano (5.7km)	Mphonde
Nsenjere Turnoff (M005) to Nsenjere (8Km)	Nkhunga

5.1. Physical Environment

Nkhotakota District lies within the Central African Rift Valley escarpments, distinguished by its diverse geographical features. It is separated from the Central African Plateau by a fault line running north-south on the western side, settling into the lake shore plains of Lake Malawi on the eastern side. The targeted M005 road segment for rehabilitation spans approximately 100 kilometers from Benga to Dwanga and is divided into two phases. Phase one covers roughly 47 kilometers from Benga to Nkhotakota Boma, while Phase two extends approximately 53 kilometers from Nkhotakota Boma to Dwangwa trading Centre.

Throughout both phases, the terrain is predominantly flat with occasional moderate slopes and undulating features. Phase II, in particular, exhibits flat terrain with few moderate to gentle slopes beyond Kaombe River, leveling out after crossing the Bua River catchment. While most of the terrain remains relatively flat, sections within Phase II, particularly around Nkhotakota and Dwangwa, may display undulating characteristics. These occasional slopes necessitate careful consideration during the planning and execution of road rehabilitation activities to ensure optimal construction practices and the stability of the roadway.

5.1.1. Topography

Nkhotakota District is characterized by the Central African Rift Valley escarpments, with the landscape descending from the west. The escarpment begins at an altitude as high as 1,638 meters on Chipata Mountain in the Nkhotakota Wildlife Reserve, gradually descending through a series of jumbled slopes and ridges to the lake shore plain at an elevation of 500-600 meters above sea level. Notable hills bordering the escarpment include Njongombe, Mbengwa, and Nkhufi under phase II of the project.

The Benga-Dwangwa road stretch, encompassing both phases and the feeder roads, runs parallel to the coastal line across the lake shore plain, which is marked by marshes concentrated around the Chia Lagoon under phase I of the project area. Deforestation activities on the escarpment, primarily due to agricultural practices outside the wildlife reserve, have resulted in the formation of deep gullies on both the escarpment and the

plain. Consequently, streams have developed across the M005 road, even in areas where they naturally did not exist.

Lake Malawi serves as a prominent geographical feature, running parallel to the earmarked M005 road stretch for its entire length. The presence of Lake Malawi significantly influences the environmental dynamics of the area, contributing to its ecological diversity and providing essential resources to the surrounding communities

5.1.2. Geology

Nkhotakota district is located within the Malawi Province of the Mozambique Orogenic Belt, exhibiting diverse geological features. To the west of Nkhotakota lies the basement complex, which showcases formations ranging from Precambrian to lower Palaeozoic age. These ancient geological structures contribute to the rugged terrain and varied landscape found in the western part of the district. In contrast, the eastern part of the district is characterized by unconsolidated and superficial deposits of the Lakeshore Plain. This area is situated at the southwestern end of the active East African Rift System, which played a significant role in the formation of Lake Malawi. The geological processes associated with rift tectonics have influenced the formation of the lake and the deposition of sedimentary materials along its shores (Harrison and Chapusa, 1975).

Nkhotakota district is located within the Malawi Province of the Mozambique Orogenic Belt, exhibiting diverse geological features. To the west of Nkhotakota lies the basement complex, which showcases formations ranging from Precambrian to lower Palaeozoic age. These ancient geological structures contribute to the rugged terrain and varied landscape found in the western part of the district. In contrast, the eastern part of the district, including the areas traversed by the Benga-Dwanga road rehabilitation project, is characterized by unconsolidated and superficial deposits of the Lakeshore Plain. This area, which encompasses both Phase I (Benga to Nkhotakota Boma) and Phase II (Nkhotakota Boma to Dwangwa trading Centre) of the project, is situated at the southwestern end of the active East African Rift System. This rift system, responsible for the formation of Lake Malawi, has influenced the geological composition and landscape of the region (Harrison and Chapusa, 1975).

The feeder roads associated with each phase of the project, such as the Kalimanjira to Chididi Health Centre Road in Phase I and the Kaombe to Roadblock Road in Phase II, also traverse areas with distinct geological characteristics. Understanding the geological diversity within these project areas is crucial for assessing the stability of infrastructure and implementing appropriate engineering practices to ensure the success of the road rehabilitation efforts

5.1.2.1. Basement Complex: Paragneisses and Schists

The prevalent lithologies in the basement complex are biotite and hornblende-bearing gneisses, often modified by migmatization. Limited occurrences of pyroxene-hornblende gneisses are found in the west, while quartzo-feldspathic gneisses dominate the southern and central sections. Calcsilicate rocks are present but constitute a minor portion of the basement complex.

5.1.2.2. Basement Complex: Igneous and Meta-Igneous Rocks

Meta-igneous and igneous rocks of ultrabasic and intermediate composition form various structures within the country gneisses. Notably, a significant late to post-tectonic granite body is identified at Saini, accompanied by minor granite and pegmatitic intrusions, along with sporadic alkaline dykes in the area.

5.1.2.3. Sedimentary and Superficial Deposits

The Lakeshore Plain is characterized by the deposition of alluvial and colluvial materials, which obscure the underlying basement complex rocks. Near Kamuona, unconsolidated and semi-consolidated sediments are observed. Thin, stony soils are prevalent in the rift valley escarpment zone, while pelitic schists give rise to brown, clayey soils.

5.1.2.4. Structure and Metamorphism

Three phases of large-scale deformation and folding are identified in the Basement Complex, accompanied by regional metamorphism under amphibolite facies conditions. The later episodes of deformation occur under conditions of decreased metamorphic grade. Northerly trends dominate the region (refer to faults depicted in Figure 13), except for east-northeast trends in the south-central sections. Intense faulting, primarily with a northerly trend (refer to faults in Figure 13, 14, and 15), occurred during the rift valley's

development, indicated by recent fault scarps and fault-controlled lake-cliffs along the Lakeshore Plain. While precise ages of the faulting remain uncertain due to the absence of stratigraphic control, the presence of such features suggests relatively recent fracturing.

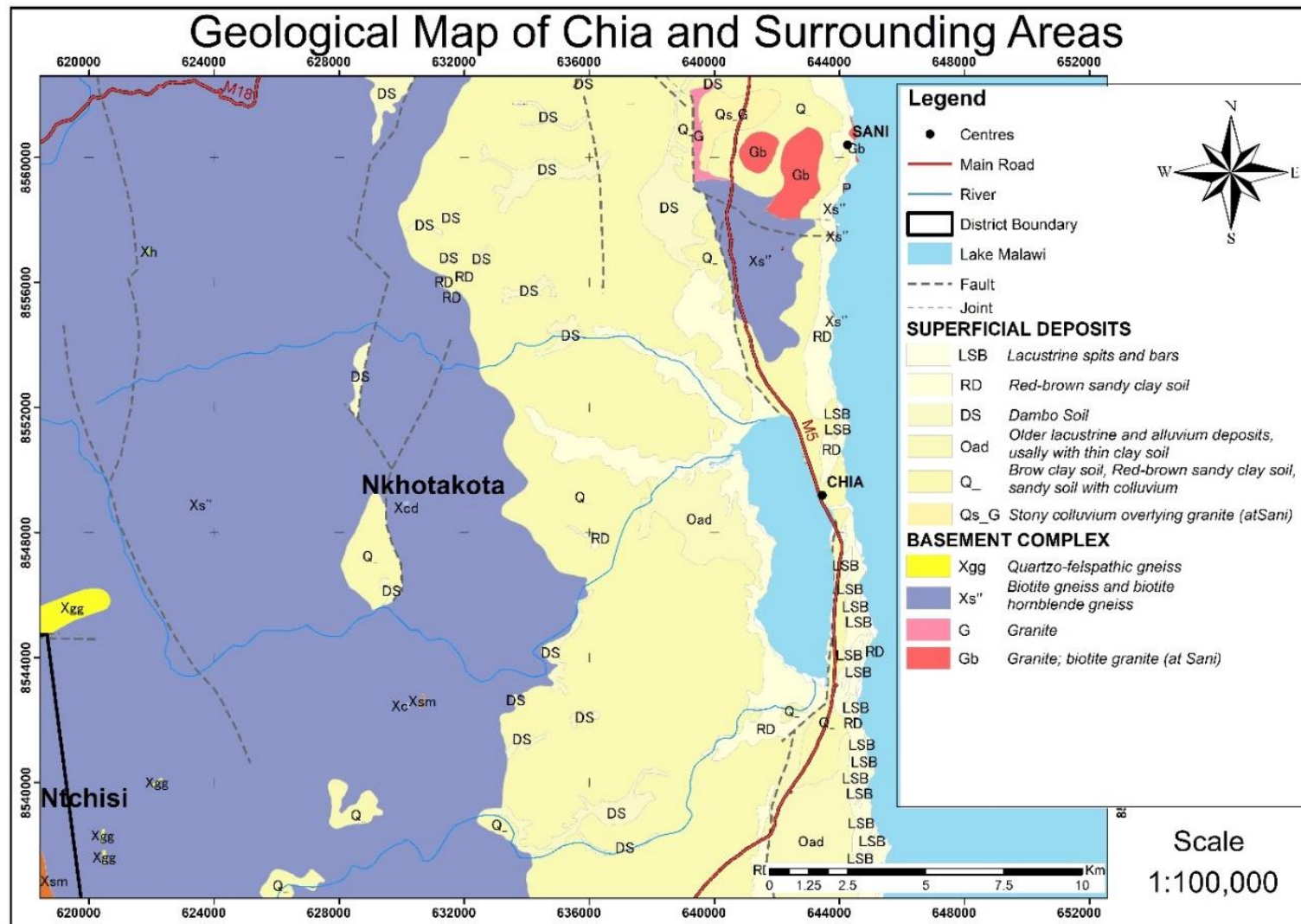


Figure 14 Geological Map showing where the M5 road construction extends in the Chia area.

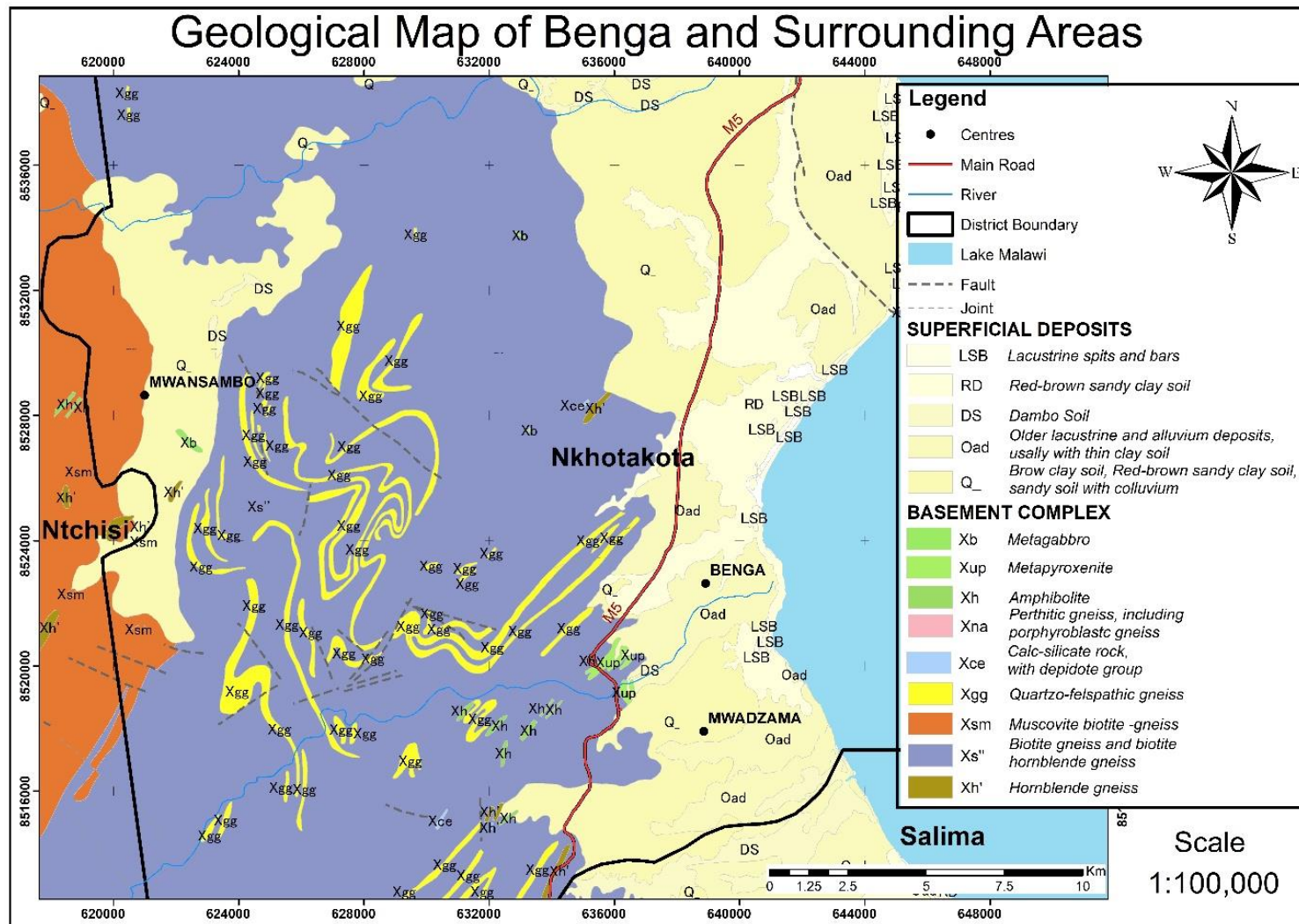


Figure 15 Geological Map showing where the M5 construction extends in the Benga area.

5.1.2.5. Observed Geology

BENGA MARKET (636423, 8521717)

Gray overburden of sandy clay. Fine grained sands with sparsely present gravel. Observed minerals are quartz, altered feldspar, iron alteration.

STOP 2 (638010, 8525053)

Light brown sandy clay. Fine grained sand. Observed minerals are quartz and feldspar.

SAINI FAULT (640580, 8558535)

The M5 cuts across the Saini fault. Rock units observed at the cross cutting are pegmatitic granites. Other rocks are hornblende and biotite bearing. Quartzofeldspathic pegmatite veins cut through the highly weathered schist. There is also presence of deformation and displacement that is evidenced by faulting of quartz veins.



Figure 16 Quartz vein at Saini fault outcrop.

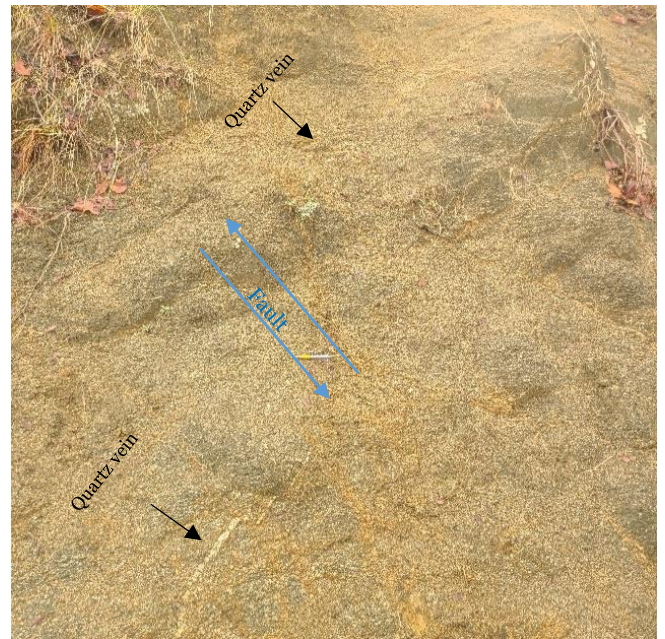


Figure 17 Evidence of faulting at Saini outcrop.

CHIA STOP (643886, 8545701)

Sand mining site along the M5 in the Chia Lagoon area.

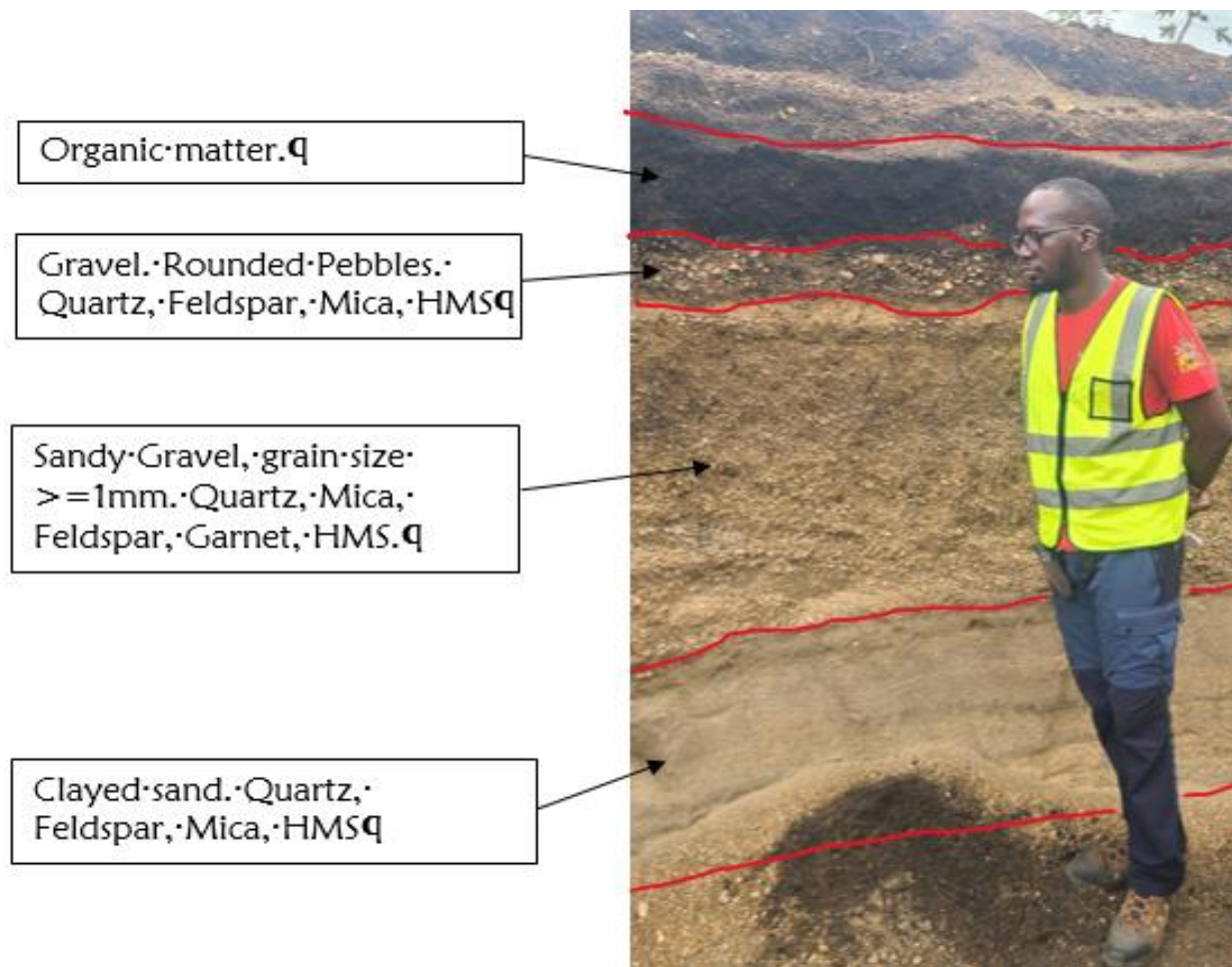


Figure 18 Open Lithological Profile around the Chia area.

STOP 5 CHIA (643418, 8549207)

Gravel sandy clay. Minerals observed are Quartz, Mica, Feldspar. Rounded pebbles that are fine to 10mm.



Figure 19 Gravel sand with HMS

STOP 6 NEAR SAINT NICOLAS ANGLICAN CHURCH

Quartzofeldspathic granite that is highly weathered. Quartz veins cut through the quartzofeldspathic matrix that is characterized by feldspar decomposing into clay that is washing away.



Figure 20 Quartzofeldspathic granite. Highly weathered feldspars disintegrating to clay



Figure 21 Quartz vein cutting through quartzofeldspathic granite.

STOP 7(640614, 8567185)

Biotite granite and quartzofeldspathic gneiss lenses seen on surface.



Figure 22. Horneblende Biotite granite.

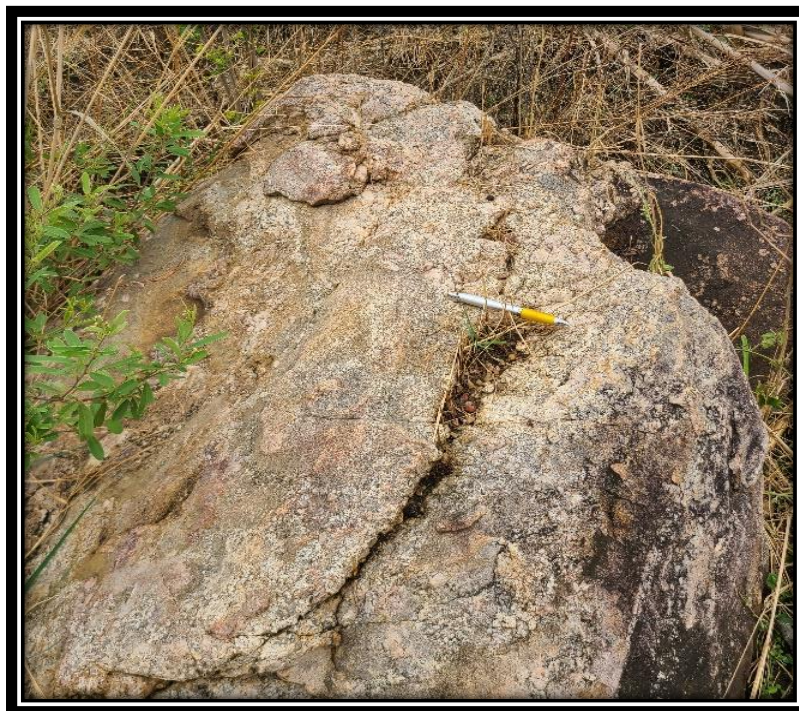


Figure 23. Quartzofeldspathic gneiss

STOP 8 BUA RIVER (629994, 8586299)

The M5 crosscuts the Mphalanyongo Fault near the Bua River. It also runs parallel to the fault on the hanging wall in other sections of the road.



Figure 24. M005 road cutting through rock units at Mphalanyongo fault near Bua river.



Figure 25. M005 cutting through fault plane at Mphalanyongo fault near BUA River.

5.1.3. Soils

The district is predominated by clay, loam and sandy soils making most of its land suitable for cultivation of a large variety of crops. Specific soil types vary from area to area; for instance, Mphonde EPA has sandy loam soils towards the Lake and red soils alongside the wildlife reserve; where as Zidyana EPA has three types of soils: sandy to sandy loam soils especially along the lake and rivers, clay soil in dambo lands and other flat lands, and gravel soils mostly scattered without specific locations (*See Table 10*).

Table 10. EPAs in project area and types of soils

EPA	SOIL TYPE
Ntosa	<ul style="list-style-type: none"> loam, sandy clay soils
Zidyana	<ul style="list-style-type: none"> Sandy to sandy loam soils especially along the lake and river Clay soil in dambo lands and other flat lands; Gravel soils mostly scattered without specific location
Linga	<ul style="list-style-type: none"> loamy sand soils,
Mphonde	<ul style="list-style-type: none"> Sandy loam (covers 50% of the total EPA area), especially towards the Lake; Red soils (covers 50% of the total EPA area), especially alongside the Game reserve
Nkhunga	<ul style="list-style-type: none"> loamy clay soils; some rocks and gravel soils areas bordering Nkhotakota Wildlife Reserve

Source: AEDCs for respective EPAs, 2022

According to Nkhotakota SEP, overall, from the subsoil to a depth of about 60cm, the soils are clay or sandy clay, which have poor drainage capacity; dambo sand covers most of the river banks and water logged areas and are suitable for cultivation of a variety of crops due the presence of grey to black clays and silts, which are usually rich in organic matter. The ridge crests which covering the wildlife reserve side are stony and has thin yellow sandy soils with gravel on the surface.

5.1.4. Climatic Conditions

Nkhotakota district experiences a tropical type of climate which has two seasons, the wet season from November to April and the dry season from May to October (SEP 2017).

5.1.4.1. Rainfall

Average annual rainfall for the district is about 1000 mm but may vary from as low as 400 mm to as high as 1700 mm. Steady rains are usually expected from December to March but information from SEP indicates that the district has been experiencing erratic patterns for the past 10 years. This is attributed to climate change caused by deforestation and other forms of environmental degradation in the district and beyond.

5.1.4.2. Temperature

Usual temperatures for the district used to range from a minimum of 20 degrees Celsius to a maximum of 29 degrees Celsius; But of late some areas have been recording temperatures high than the usual. Mphonde EPA has been registering higher than usual temperatures raging from a minimum of 26 degrees to as high as 34 degrees since 2019 (Mphonde AEDC 2022).

5.1.4.3. Climate Change

According to Nkhotakota SEP, there has been an increasing trend observed in the amount of rainfall received in the district despite registering no significant changes in the total or annual rainfall for the district. Increase in temperature was also reported in some EPAs such as the case of Mphonde as alluded to above.

The changes in weather patterns have had some effects in the district. A number of environmental hazards which range from floods, dry spells, strong winds, pest and disease outbreaks were reported by EPAs within project area. None the less, the occurrence of floods in the district can be attributed more environmental degradation than to climate change.

Table - 11: natural disasters associated with climate change

EPA	floods	drought	dry spells	Strong winds	crop pests & diseases	animal pests & disease
NTOSA	√		√		√	√
ZIDYANA	√		√	√	√	√
LINGA	√		√			
MPHONDE	√		√		√	√
NKHUNGA	√	√			√	√

(Source: EPAs)

5.1.5. Hydrology

The area has numerous rivers and streams draining water from the hilly area on the west to the lake on the east (*See Figure 26*). The water table is very close to the surface, especially the stretch from Mkaika to just beyond Nkhotakota Boma, resulting in having mushy areas like the Chia area and water-logged sections along the M005 road. Due to the flatness of the terrain, some of the rivers are prone to flooding; rivers most prone to floods include Chilwa, Mkhula, Lipsodzi, Kaombe, Bua and Dwangwa. The Chia Lagoon is a unique hydrological feature in that it both drains into and gets recharged by Lake Malawi depending on the water levels in the lake; during the dry season water moves from the lake into the lagoon, while in the rainy season it is mainly recharged by streams within its catchment area and drains into the lake. According to Nkhotakota council's district environmental sub-committee (DESC), the M005 in its current state acts as a drainage obstruction to both underground and surface water flowing from the escarpment to the lake since the design does not provide sufficient drainage structures to accommodate the excessive water resulting from increased rainfall intensities experienced in the pasted 10 years or so.

Table - 12: Rivers crossing the targeted road section according to Traditional Authority Area

TA Mwadzani	TA Kalimanjira	TA Mphonde	TA Kanyenda	TA Malen Chanzi	TA Nkhanga
Chiluwa (floods)	Chia channel	Kaombe (major)	Bua (major)		
Mkhula	Chota (small)	Bua (major)	Navonde (small)		
Lipsodzi	Lingona (small)		Kamwala		
Navikoko			Msenjere		
			Liwaladzi		
			Malanatha		
			Mikongwe		
			Dwangwa (major)		

Source: Environmental District Officer, 2022



5.2. Water Quality Status of Major Rivers of the Project Area

This component of the ESIA study, was aimed at updating the baseline environmental status (water quality assessment) of the surface water sources along M5 Road construction project. Specifically, the work was performed 1) to update and assess the second environmental status (second baseline data) of the surface water quality within the vicinity of the M5 road construction project along the lakeshore (Benga to Dwanga) in Nkhhotakota District, and b) to prepare an updated (second) baseline water quality report and identification of the potential impacts of the M5 Road Construction project and their possible mitigation factors.

To assess the updated status of water quality of streams and rivers, the following major streams and rivers along the M5 road were studied: Mikongwe, Liwaladzi, Dwangwa, Chikwale, Chizeu, Msenjere, Navunde, Bua, Khako, Kasangazi, Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia, Navikoko, and Lipyozi. The majority of these rivers and streams are perennial and cross the M5 road along the lakeshore. The sampling techniques and physico-chemical and microbiological analyses were performed in line with the Malawi Bureau of Standards and international procedures (MS 682-1:2002; MS 682-6:2012, MS 682-3:2002; APHA 2011). Water samples were collected from 19 major rivers along the M5 road. The following physico-chemical and microbiological water quality parameters were measured: pH, total dissolved solids (TDS), electrical conductivity (EC), dissolved oxygen (DO), water temperature, flow rate, calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), copper (Cu), chloride (Cl⁻), nitrate (NO₃⁻) sulphate (SO₄²⁻), phosphate (PO₄³⁻), Faecal Coliform (FC) and Faecal Streptococci (FS).

Generally, the water quality for the updated and second baseline data and water quality status of the surface water sources (rivers) within the M5 road construction appears to be within the set limits except for FC and FS. In the first phase, the FC ranged from 2 to too Numerous to Count (TNTC) while the FS ranged from 0 to TNTC CFUs/ 100 mL. About 9 rivers including Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia, Navikoko and Lipyodzi rivers had the lowest FC (0 CFUs/ 100 mL) and 10 rivers including Navunde, Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia,

Navikoko and Lipyodzi rivers had the lowest FS (0 CFUs/ 100 mL), hence considered not contaminated with any fecal matter at the time of the study. During the second phase, FC ranged from 0 to 1001 CFUs/100 mL with an average of 180 CFUs/100 mL while the FS ranged from 0 to 2190 CFUs/100 mL with an average count of 833 CFUs/100 mL. The majority of the rivers were contaminated with faecal coliforms except Msenjere, Bua and Kaombe. There were no noticeable and significant sources of contamination either within the project site or nearby water bodies during the time of the study. The water quality status for the second phase was noted to be within limits except FS and FC which were generally high. In a few cases, high levels of bacteria were due to rains during the sampling time that promoted erosion, run-off and deposition of other contaminants into the rivers. There was no noticeable impact of human and animal activities on surface water quality within the M5 Road project sites at the time of the second phase assessment except for microbial contamination. Annex 5 provides detailed report of the water analysis. Recommendations and possible impacts on surface water sources resulting from the road construction, among others, will be mitigated as follows:

- Provision of sufficient drains for easy drainage flow
- Prevention of dumping of construction spoil and debris in streams and rivers
- Proper waste management facilities to be provided in construction camps
- Contaminated runoff from storage areas needs to be captured in ditches or ponds.
- Apply sealing or binding materials in the case of major spills of hazardous materials (liquids).
- At specific locations (e.g. borrow pits, trig pillars and other excavation sites) where gravel and other construction materials will be collected, the collected surface waters will have to be contained and avoid spill-over into nearby rivers and streams.

5.3. Biological Environment

5.3.1. Flora and fauna

According to the district's forest office, the district does not exhibit a significant diversity of terrestrial plants and animals, except within the wildlife reserves, which boast a rich and diverse array of both flora and fauna.

5.3.1.1. Flora

The Nkhotakota district, situated in Malawi, is home to a diverse and vibrant ecosystem characterized by an array of plant species. This rich botanical diversity plays a vital role in the district's ecological balance and cultural heritage. Understanding and preserving this natural wealth is paramount, especially in the context of development projects like the Benga - Dwangwa Road Rehabilitation. In light of this, an extensive biodiversity assessment was conducted to comprehensively document the plant species across various ecological locations within the district.

Flora of Nkhotakota District

The protected areas in Nkhotakota district predominantly feature *Brachystegia* and *Julbernardia* species, constituting the Miombo ecosystem. Species such as *Julbernardia paniculata* (Mombo), *Brachystegia longifolia* (Tsamba), *Uapaca kirkiana* (Masuku), *Percopsis angolensis* (Muwanga), and *Pterocarpus angolensis* (Mlombwa) are among the key components of these areas. Furthermore, indigenous bamboos (*Oxytenanthera abyssinica*) thrive on the escarpments, adding to the district's botanical richness (SEP 2017).

Ecological Location Survey

In November 2023, a comprehensive vegetation survey was carried out across diverse ecological locations in Nkhotakota district. This survey encompassed sites such as the Dwangwa bridge, Mikongwe River, Nkhotakota Reserve, Bua River, Kasadzi area, and Chiya Lagoon, among others. Each location provided unique insights into the native plant species and their interactions with the surrounding environment.

Plant Species Diversity

Table 13 presents a detailed account of plant species diversity observed during this survey. The table features a wide range of plant species, from native trees like *Albizia lebbeck* and *Faidherbia albida* to fruit-bearing trees such as *Mangifera indica* and *Citrus sinensis*. The data in Table 13 serves as a critical reference point for understanding the ecological significance of these locations and the importance of preserving their natural habitats.

Table 13. Plant Species Diversity in Nkhotakota District

Species Name	Count
<i>Adansonia digitate</i>	1
<i>Albizia anthemintica</i>	2
<i>Albizia lebbeck</i>	132
<i>Albizia versicolor</i>	24
<i>Annona senegalensis</i>	38
<i>Antidesma venosum</i>	7
<i>Bauhinia petersiana</i>	37
<i>Berchemia discolor</i>	3
<i>Brachiaria brizantha</i>	4
<i>Brachystegia boehmii</i>	24
<i>Brachystegia utilis</i>	11
<i>Burkea Africana</i>	4
<i>Burrtdevya nyasica</i>	17
<i>Cajanus cajan</i>	1
<i>Catunaregum spinosa</i>	18
<i>Chorisia gayana</i>	1
<i>Combretum massambicensis</i>	36
<i>Combretum mole</i>	6
<i>Combretum zeyheri</i>	14
<i>Commiphora Africana</i>	5
<i>Cordia Africana</i>	3
<i>Crossopteryx febrifuga</i>	3

Species Name	Count
Dalbergia nitidula	8
Dichrostachys cinereal	18
Diospyros kirkii	15
Diplorynchus condylocarpon	56
Eucalyptus camaldulensis	44
Eucalyptus tereticornis	6
Faidherbia albida	68
Ficus sur	20
Ficus sycomorus	20
Flacourtia indica	4
Gliricidia sepium	5
Gmelina arborea	209
Grewia bicolor	4
Jacaranda mimosaeifolia	5
Julbernadia globiflora	67
Khaya anthotheca	2
Kigelia Africana	8
Kirkia acuminate	9
Lannea discolour	5
Lantana camara	
Leucaena leucocephala	10
Mangifera indica	63
Manihot esculenta	6
Markhamia obtusifolia	2
Monocymbium ceresiform	1
Mussa paradasiaca	7
Ormocarpum kirkii	4
Ozoroa insignis	15
Parinari curatellifolia	24
Pericopsis angolensis	14

Species Name	Count
Philenoptera violacea	53
Phragmites mauritiana	3
Phyllanthus guineensis	26
Piliostigma thonningii	146
Premmina senensis	3
Pseudolachnostylis maprouneifolia	9
Psidium guajava	28
Psolospermum febrifugum	6
Pterocarpus angolensis	34
Sclerocarya birrea	8
Securidaca longepedunculata	3
Senegalia polycantha	37
Senna petersiana	8
Senna siamea	85
Senna spectabilis	7
Sida acuta	2
Sida cordifolia	4
Solanum agivie	15
Solanum nigrum	17
Stereospermum kunthianum	32
Syzygium owariense	9
Tamarindus indica	12
Terminalia imberbe	91
Terminalia sericea	81
Terminalia stenostachya	18
Themeda triandra	1
Thevetia peruviana	15
Toona ciliata	33
Trichilia emetica	6
Typha senensis	1

Species Name	Count
Vachellia goetzei	19
Vachellia karroo	13
Vachellia seyal	24
Vachellia sieberiana	57
Vachellia tortilis	14
Vangueria infausta	3
Vernonia amygdalina	9
Vernonia corolata	6
Vernonia oxyura	14
Vitex payos	26
Ziziphus mauritiana	42

Conservation Status and its Implications.

Table 14 complements the survey findings by identifying specific plant species along the targeted road stretch and their conservation status. Notably, the table highlights endangered species such as *Pterocarpus angolensis* (Mlombwa) and *Khaya anthotheca* (M'bawa/Mahogany), underscoring the importance of preserving their habitats. Additionally, it mentions species like *Psidium guajava* (Guava) and *Tamarindus indica* (Tamarind) categorized as "Least Concern," signifying relatively stable conservation statuses.

These findings stem from a comprehensive biodiversity assessment conducted along the Benga - Dwangwa M005 road project stretch. The survey was meticulously planned and executed to identify and document specific plant species in the region. The focus extended beyond mere species identification, encompassing the assessment of their conservation status, an essential component for environmental impact assessments and the development of mitigation strategies to safeguard the local flora.

The survey along the Benga - Dwangwa M005 road project stretch is a significant step towards recognizing and preserving the unique plant species in this region. The data collected serves as a crucial resource for ongoing and future environmental planning and

conservation strategies, ensuring the protection of this precious natural heritage for generations to come.

Table 14. Wild plant species identified along the targeted road stretch and their conservation status.

Plant	Botanical Name	Conservation Status
Mlombwa	<i>Pterocarpus angolensis</i>	Endangered
Mombo	<i>Julbernardia paniculata</i>	
Tsamba	<i>Brachystegia longifolia</i>	
Masuku	<i>Uapaca kirkiana</i>	
Muwanga	<i>Percopsis angolensis</i>	Endangered
Blue gum	<i>Eucalyptus globulus</i>	
Baobab	<i>Adansonia digitata</i>	
Acacias	<i>Vachellia tortilis</i>	Least Concern
Malay beechwood	<i>Gmelina arborea</i>	Least Concern
Mthete, white thorn	<i>Senegalia polyacantha</i>	
Mango	<i>Mangifera indica</i>	
Guava	<i>Psidium guajava</i>	Least Concern
Tamarind, bwemba	<i>Tamarindus indica</i>	Least Concern
Visekese	<i>Piliostigma thonningii</i>	
m'bawa/mahogany	<i>Khaya anthotheca</i>	Endangered
Nkuyu, Egyptian balsam	<i>Balanites aegyptiaca</i>	
Bamboos	<i>Oxytenanthera abyssinica</i>	
Vetiva	<i>Chtysopogon zizanioides</i>	

Source: Transect walk; National Parks & Wildlife (Protected, Endangered, and Listed Species) (Declaration) Order, 2017; IUCN Red List of Threatened Species, 2017.

Table 15. Plant Species and Their Conservation Status

Species Name	IUCN Status
<i>Adansonia digitate</i>	Common
<i>Albizia anthemintica</i>	Common

Species Name	IUCN Status
Albizia lebbeck	Common
Albizia versicolor	Common
Albizia versicolor	Common
Annona senegalensis	Common
Annona senegalensis	Common
Antidesma venosum	Common
Bauhinia petersiana	Common
Berchemia discolor	Common
Brachiaria brizantha	Common
Brachiaria brizantha	Common
Brachystegia boehmii	Common
Brachystegia boehmii	Common
Brachystegia utilis	Common
Burkea Africana	Common
Burrtavya nyasica	Common
Cajanus cajan	Common
Catunaregum spinosa	Common
Chloris gayana	Common
Combretum massambicensis	Common
Combretum mole	Common
Combretum mossambicensis	Common
Combretum zeyheri	Common
Commiphora Africana	Common
Cordia Africana	Common
Crossopteryx febrifuga	Common
Dalbergia nitidula	Common
Dichrostachys cinerea	Common
Dichrostachys cinerea	Common
Diospyros kirkii	Common
Diplorhynchus condylocarpon	Common

Species Name	IUCN Status
Eucalyptus camaldulensis	Common
Eucalyptus tereticornis	Common
Faidherbia albida	Treated
Faidherbia albida	Endangered
Faidherbia albida	Common
Ficus sur	Common
Ficus sycomorus	Common
Flacourtia indica	Common
Gliricidia sepium	Common
Gmelina arborea	Common
Gmelina arborea	Common
Gmelina arborea	Common
Grewia bicolor	Common
Jacaranda mimosaeifolia	Common
Julbernardia globiflora	Common
Julbernardia globiflora	Common
Khaya anthotheca	Common
Kigelia Africana	Common
Kirkia acuminata	Common
Lannea discolour	Common
Lantana camara	Common
Leucaena leucocephala	Common
Mangifera indica	Common
Manihot esculenta	Common
Markhamia obtusifolia	Common
Monocymbium ceresiform	Common
Mussa paradasca	Common
Mussa paradasiaca	Common
Ormocarpum kirkii	Common
Ozoroa insignis	Common

Species Name	IUCN Status
Parinari curatellifolia	Nearly endangered
Parinari curatellifolia	Common
Pericopsis angolensis	Endangered
Pericopsis angolensis	Common
Philenoptera violacea	Common
Philenoptra violaceae	Common
Phragmites mauritiana	Common
Phyllanthus guineensis	Common
Piliostigma thonningii	Common
Piliostigma thonningii	Common
Premmina senensis	Common
Pseudolachnostylis maprouneifolia ⁹	Common
Psidium guajava	Common
Psolospermum febrifugum	Common
Pterocarpus angolensis	Endangered
Pterocarpus angolensis	Endangered
Pterocarpus angolensis	Threatened
Sclerocarya birrea	Common
Securidaca longepedunculata	Common
Senegalia polycantha	Common
Senna petersiana	Common
Senna siamea	Common
Senna spectabilis	Common
Sida acuta	Common
Sida cordifolia	Common
Solanum agave	Endangered
Solanum nigrum	Common
Solanum nigrum	Common
Stereospermum kunthianum	Common
Syzygium owariense	Common

Species Name	IUCN Status
Tamarindus indica	Common
Terminalia imberbe	Threated
Terminalia sericea	Endengered
Terminalia sericea	Common
Terminalia sericea	Endangered
Terminalia stenostachya	Common
Terminaria stenostachya	Common
Themeda triandra	Common
Thevetia peruviana	Common
Toona ciliate	Common
Toona siliata	Common
Trichilia emetica	Common
Typha senensis	Common
Vachellia goetzei	Common
Vachellia karroo	Common
Vachellia seyal	Common
Vachellia sieberiana	Common
Vachellia tortilis	Common
Vangueria infausta	Common
Vernonia amygdalina	Common
Vernonia corolata	Common
Vernonia oxyura	Common
Vitex payos	Common
Ziziphus mauritiana	Common
Zizyphus mauritiana	Common

Source: Biodiversity Survey -Transect walk, 2023.

The identification of endangered species such as *Pterocarpus angolensis* (Mlombwa) and *Khaya anthotheca* (M'bawa/Mahogany) raises concerns about the potential impacts of the road construction on their habitats. To mitigate these impacts and ensure the preservation of these valuable species, a series of measures have been proposed. These measures include:

- Establishment of protected areas or conservation zones along the road stretch where these species are found, restricting construction activities and human encroachment to minimize disturbance to their habitats.
- Implementation of habitat restoration and enhancement programs to rehabilitate degraded areas and create suitable habitats for endangered species to thrive.
- Implementation of strict environmental management and monitoring protocols during construction activities to minimize disturbances to habitats and ensure compliance with environmental regulations.
- Incorporation of green infrastructure and eco-friendly construction practices to minimize the ecological footprint of the road project and mitigate potential impacts on endangered species and their habitats

5.3.1.2. Fauna

The district has diverse habitats suitable for mammals, fish, birds, reptiles, amphibians and insects. There are relatively detailed records on mammals, birds and fish resulting from extensive studies conducted in the district in these areas; unlike reptiles, amphibians and insects which lack district specific data. The survey conducted during the dry season and the beginning of the rainy season in November to December 2023 along the Benga-Dwangwa M005 road section is a critical component of a major infrastructure project undertaken by the Government of Malawi in partnership with the AfDB. The primary objective of the survey is to comprehensively assess the biodiversity and fauna within the project area. As this road corridor represents a significant lifeline for trade, agriculture, and community connectivity in Malawi, it is imperative to understand and mitigate the potential impacts of the road's rehabilitation and expansion on the local wildlife.

The importance of this survey cannot be overstated. It serves as a crucial tool to inform the responsible planning and execution of the Benga-Dwangwa M005 road project. By systematically gathering data on the diverse range of animal species inhabiting the area, we can make informed decisions to minimize environmental disruptions, protect sensitive habitats, and preserve the rich biodiversity that Malawi treasures. The survey area spans the Benga to Dwangwa section of the M005 road, covering a diverse range of habitats and ecosystems. This road corridor traverses regions vital to Malawi's economy and community

well-being, making it an indispensable part of the country's transportation network. Understanding the geographical context is fundamental to comprehending the intricacies of this survey, as the terrain and habitats encountered along the road greatly influence the survey design and its findings.

Survey Design

The survey conducted for the Benga-Dwangwa M005 road project is meticulously structured to provide a comprehensive understanding of the local fauna and its interaction with the proposed road rehabilitation and expansion. The survey design can be delineated into two distinct components, each serving a unique purpose:

- i. ***Systematic Survey Sites:*** This component involves the selection of specific survey sites strategically positioned to represent major habitat types found within the project area. The rationale behind this systematic approach is to ensure that the data collected is both representative and informative. Survey sites are established on both sides of the road, situated at a standardized distance of 30 meters from the road's center. Within each survey site, active searching on transect walks is conducted. Information gathered includes coordinates, photographic records, vegetation structure, dominant species in each stratum, and signs of disturbance, both historical and recent. The systematic survey sites are vital for establishing baseline data and understanding the direct impact of road construction on local fauna.
- ii. ***Non-Systematic Surveying:*** In addition to the systematic survey sites, a non-systematic or opportunistic surveying approach was employed. This method captured data outside of the structured survey periods and sites. It included opportunistic sightings of all encountered species during project-related activities and travel within the area during daylight hours. Moreover, secondary evidence such as tracks, diggings, faeces, burrows, and nests is recorded whenever and wherever possible. This approach provides a more holistic view of wildlife distribution and behavior patterns beyond the predefined survey sites and times.

The careful integration of these two survey components ensures a comprehensive assessment of the animal populations in the project area, aiding in the formulation of effective mitigation measures to safeguard the local biodiversity during the road's rehabilitation and expansion.



Figure 27. One of the sampled habitat.



Figure 28. On this bridge both aquatic and animals like amphibians were sampled.



Figure 29. Another site with less vegetation.



Figure 30. Aquatic sampling Amphibians.

5.3.1.3. Mammals

The mammal survey conducted in the project sites along the Benga-Dwangwa M005 road section identified a total of 27 mammal species. Remarkably, all of these species are categorized as "Least Concern" in terms of conservation status, indicating the importance of this region for preserving mammalian biodiversity. Most of the mammals available in the area are confined to protected areas, mainly the Nkhotakota Wildlife Reserve under the management of African Parks (AP). Lion, wild dog, hippo, black rhino, and puku once occurred in Nkhotakota and some went locally extinct a few years before AP took over management in 2015. Below is the documented mammal list for the district.

Table 16 provides an overview of mammal species distribution by family, highlighting the number of species within each family and their respective percentage representation. It underscores the diversity of mammalian fauna in the project area.

Table 16. Species Richness per Family

Number	Order	Family	Spicies	Common Name
1	Rodentia	Muridae	Dasymys incomtus	African Marsh Rat
2	Carnivora	Felidae	Feris silvestris cafra	African Wild Cat
3	Carnivora	Herpestidae	Mungos mungo	Banded Mongoose
4	Artiodactyla	Bovidae	Tragelaphus scriptus	Bush back
5	Artiodactyla	Suidae	Potamochoerus larvatus	bush pig
6	Rodentia	Muridae	Tatera leucogaster	Bushveld Gerbil
7	Rodentia	Nesomyidae	Dendromus mystacalis	Chestnut Climbing Mouse
8	Artiodactyla	Bovidae	Slyvicapra grimmia	Common duiker
9	Carnivora	Viverridae	Genetta maculata	Common Large-spotted Genet
10	Rodentia	Bathyrgidae	Cryptomys hottentotus	Common Mole rat
11	Rodentia	Nesomyidae	Steatomys pratensis	Fat Mouse
12	Macroscelidea	Macroscelididae	Petrdromus tetradactylus	Four-toed Elephant Shrew
13	Rodentia	Muridae	Cricetomys gambianus	Gambian Giant Pouched Rat
14	Carnivora	Viverridae	Herpestes ichneumon	Large grey Mongoose
15	Rodentia	Muridae	mustomys natalensis	Multimammate mouse
16	Eulipotyphla	Soricidae	Genus crocidura	Musk Shrew
17	Macroscelidea	Macroscelididae	Elephantulus fuscus	Peter's Short snouted sengi
18	Rodentia	Cricetomyinae	Saccostomus capensis	Pouched Mouse

Number	Order	Family	Spicies	Common Name
19	Rodentia	Anomaluridae	Paraxerus palliatus	Red Squirrel
20	Lagomorpha	Leporidae	Lepus saxotilis	Scrub Hare
21	Carnivora	Canidae	Canis adustus	Side-stripped Jackal
22	Carnivora	Mustelidae	Hydrictis maculicollis	Spotted-necked Otter
23	Primate	Galagidae	Otolemur crassicaudatus	Thicl-tailed Galago
24	Eulipotyphla	Soricidae	Crocidura fuscomurina	Tiny Musk Shrew
25	Rodentia	Anomaluridae	Paraxerus cepapi	Tree Squirrel
26	Primate	Cercopithecidae	Cercopithecus aethiops	Vervet monkey
27	Primate	Cercopithecidae	Papio cynocephalus	yellow baboon

Table 17. Shows species Richness per Family.

Family	No of species	% / Family
Anomaluridae	2	7.407
Bathyrgidae	1	3.703
Bovidae	2	7.407
Canidae	1	3.703
Cercopithecidae	2	7.407
Cricetomyinae	1	3.703
Felidae	1	3.703
Galagidae	1	3.703
Herpestidae	1	3.703
Leporidae	1	3.703
Macroscelididae	2	7.407
Muridae	4	14.814
Mustelidae	1	3.703
Nesomyidae	2	7.407
Soricidae	2	7.407
Suidae	1	3.703
Viverridae	2	7.407
	27	99.99

The graph visually illustrates the distribution of mammal species across different families encountered during the survey. The dominance of the Muridae family is evident, reflecting the significance of this family in the local ecosystem.

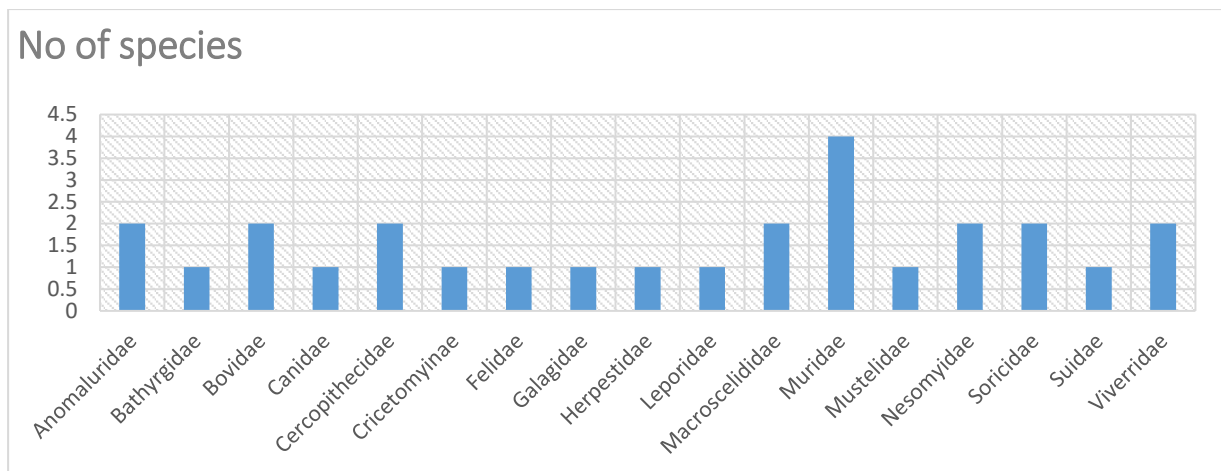


Figure 31. Number of Species per Family.

Figure 31 shows photographic records of some mammal species encountered during the survey, offering visual insights into the mammalian diversity in the project area.



Velvet Monkey



African Wild Cat Scat



Bush back foot print



Active burrow of *Mustomys natalensis*

Figure 32. Shows photographic records of some mammal species

5.3.1.4. Birds

The purpose of this survey was to assess the bird species richness in the project sites along the Benga-Dwangwa M005 road section in Malawi. This assessment was crucial in understanding the local avian biodiversity, which is a vital component of the region's ecosystem. Birds play essential roles in pollination, pest control, and seed dispersal, making their conservation important for maintaining ecological balance. The bird survey aimed to provide a comprehensive understanding of the avian fauna in the project area. The survey methodology involved systematic sampling at various sites along the road section. Birds were observed, identified, and recorded to determine species richness, and data was subsequently categorized by family for analysis. A total of 68 bird species were encountered during the survey, all of which are categorized as "Least Concern" in terms of conservation status. These species belong to various families, with the Estrildidae family being the most dominant.

Table 18 provides a breakdown of bird species by family, highlighting the number of species and their percentage representation within each family. It further emphasizes the diversity of avian fauna in the project area.

Table 18. Species Richness per Family

Number	Order	Family	Species	Common Name
1	Charadriiformes	Charadriidae	Charadrius tricollaris	Three-banded Plover
2	Charadriiformes	Jacanidae	Actophilornis africanus	African Jacana
3	Passeriformes	Ploceidae	Ploceus velatus	African Masked Weaver
4	Apodiformes	Apodidae	Cypsiurus parvus	African Palm Swift
5	Passeriformes	Motacillidae	Motacilla aguimp	African pied Wagtail
6	Passeriformes	Timaliidae	Turdoides jardineii	Arrow-marked babbler
7	Passeriformes	Hirundinidae	Hirundo rustica	Barn Swallow
8	Piciformes	Lybiidae	Lybius torquatus	Black-collared Barbet
9	Gruiformes	Rallidae	Amaurornis flavirostra	Black Crake
10	Passeriformes	Malaconotidae	Tchagra senegalus	Black Crowned Tchagra
11	Caprimulgiformes	Caprimulgidae	Campephaga flava	Black Cuckoo-shrike
12	Passeriformes	Nectarinidae	Chalcomitra amethystina	Black Sunbird
13	Pelecaniformes	Ardeidae	Ardea melanocephala	Black-headed Heron
14	Passeriformes	Estrildidae	Lagonosticta rubricata	Blue billed firefinch
15	Columbiformes	Columbidae	Turtur afer	Blue Spotted Wood Dove
16	Passeriformes	Estrildidae	Uraeginthus angolensis	Blue Waxbill
17	Coraciiformes	Coraciidae	Eurystomus glaucurus	Broad-billed Roller
18	Passeriformes	Estrildidae	Spermestes cucullata	Bronze Manikin

Number	Order	Family	Species	Common Name
19	Coraciiformes	Alcedinidae	Halcyon albiventris	Brown Hooded Kingfisher
20	Accipitriformes	Accipitridae	Circaetus cinereus	Brown Snake Eagle
21	Passeriformes	Malaconotinidae	Tchagra australis	Brown-headed Tchagra
22	Cuculiformes	Culculidae	Centropus superciliosus	Burchell's Coucal
23	Columbiformes	Columbidae	Streptopelia capicola	Cape Turtle Dove
24	Passeriformes	Platysteiridae	Batis molitor	Chin Spot Batis
25	Passeriformes	Estrildidae	Estrilda astrild	Common Waxbill
26	Passeriformes	Cisticolidae	Cisticola natalensis	Croacking Cisticola
27	Bucerotiformes	Bucerotidae	Tockus alboterminatus	Crowned Horbill
28	Passeriformes	Pycnonotidae	Pycnonotus tricolor	Dark capped Bulbul
29	Passeriformes	Oriolidae	Oriolus larvatus	Eastern Black-headed Oriole
30	Apodiformes	Apodidae	Apus apus	Eurasian Swift
31	Coraciformes	Meropidae	Apiester merops	European Bee Eater
32	Caprimulgiformes	Caprimulgidae	Caprimulgus pectoralis	Fiery-necked Nightjar
33	Passeriformes	Alaudidae	Mirafr rufocinnamomea	Flappet Lark
34	Passeriformes	Dicruridae	Dicrurus adsimilis	Folk-tailed Drongo
35	Strigiformes	Strigidae	Bubo lacteus	Giant Owl
36	Pelecaniformes	Ardeidae	Egretta alba	Great White Egret
37	Plecaniformes	Scopidae	Scopus umbretta	Harmecop

Number	Order	Family	Species	Common Name
38	Galliformes	Numinidae	Numida meleagris	Helmeted Guinea Fowl
39	Passeriformes	Malaconotinidae	Cossypha heuglini	Heuglin Robin
40	Passeriformes	Passeridae	Passer domesticus	House Sparrow
41	Cuculiformes	Cuculidae	Chrysococcyx klaas	Klaas's Cuckoo
42	Passeriformes	Ploceidae	Ploceus xanthops	Large Golden Weaver
43	Passeriformes	Sylviidae	Acrocephalus gracilirostris	Lesser Swamp Warbler
44	Coraciiformes	Coraciidae	Coracias caudatus	Lilac -breasted Roller
45	Coraciiformes	Meropidae	Merops pusillus	Little Bee-eater
46	Passeriformes	Corvidae	Corvus albus	Pied Crow
47	Coraciiformes	Alcedinidae	Ceryle rudis	Pied Kingfisher
48	Passeriformes	Viduidae	Vidua macroura	Pin-tailed Widow
49	Passeriformes	Cisticolidae	Cisticola Chiniana	Rattling Cisticola
50	Passeriformes	Ploceidae	Ploceus orix	Red Bishop
51	Passeriformes	Estrildidae	Lagonosticta senegala	Red-billed Firefinch
52	Columbiformes	Columbidae	Streptopelia semitorquata	Red-eyed Dove
53	Passeriformes	Cisticolidae	Cisticola erthrops	Red-faced Cisticola
54	Passeriformes	Sylviidae	Sylvietta whytii	Red-faced Crombec
55	Galliformes	Phasianidae	Francolinus afer	Red-necked Francolin
56	Suliformes	Phalacrocoracidae	Phalacrocorax africanus	Reed Cormorant

Number	Order	Family	Species	Common Name
57	Passeriformes	Malaconotinidae	Dryoscopus cubla	Southern Puff back
58	Caliiformes	Coliidae	Colius striatus	Speckled Mousebird
59	Passeriformes	Ploceidae	Ploceus ocularis	Spectacled Weaver
60	Coraciiformes	Alcedinidae	Halcyon chelicuti	Stripped Kingfisher
61	Passeriformes	Estrildidae	Estrilda melanotis	Swee Waxbill
62	Passeriformes	Cisticolidae	Prinia subflava	Tawny-flanked Prinia
63	Passeriformes	Malaconotinidae	Laniarius aethiopicus	Tropical Boubou
64	Passeriformes	Viduidae	Vidua chalybeata	Village Indigo bird
65	Anseriformes	Anatidae	Dendrocygna viduata	White-faced Tree Duck
66	Passeriformes	Nectarinidae	Nectarinia venusta	Yellow- bellied Sunbird
67	Passeriformes	Fringillidae	Serinus mosambicus	Yellow-fronted Canary
68	Passeriformes	Ploceidae	Euplectes capensis	Yellow-Rumped Bishop

Table 19. Shows species Richness per Family

Family name	No of species	% / Family
Accipitridae	1	1.538
Alaudidae	1	1.538
Alcedinidae	3	4.411
Anatidae	1	1.538
Apodidae	2	2.941
Ardeidae	1	1.538
Ardeidae	1	1.538
Bucerotidae	1	1.538
Caprimulgidae	2	2.941
Charadriidae	1	1.538
Cisticolidae	4	5.882
Coliidae	1	1.538
Columbidae	3	4.411
Coraciidae	2	2.941
Corvidae	1	1.538
Cuculidae	2	2.941
Dicruridae	1	1.538
Estrildidae	6	8.823
Fringillidae	1	1.538
Hirundinidae	1	1.538
Jacaniidae	1	1.538
Lybiidae	1	1.538
Malaconotinidae	5	7.352
Meropidae	2	2.941
Motacillidae	1	1.538
Nectarinidae	2	2.941
Numinidae	1	1.538
Oriolidae	1	1.538



Figure 34. White-faced Tree Duck -
Dendrocygna viduata



Figure 35. Spectacled
Weaver

5.3.1.5. Fish

Nkhotakota district boasts a diverse array of fish species inhabiting Lake Malawi, Chia Lagoon, and the major rivers in the district. Among these species, several are of conservation concern, as highlighted in Table 20 below:

Table - 20 Fish Diversity and Composition, and their conservation status

<i>Species</i>		<i>% Contribution</i>	<i>Conservation status</i>
<i>Local Name</i>	<i>Scientific Name</i>		
<i>Chambo</i>	<i>Oreochromis Karonga</i>	1.4	<i>Critically endangered/ Listed</i>
<i>O. tilapia</i>	<i>Other Tilapia species</i>	1.9	
<i>Utaka</i>	<i>Copadichromis species</i>	10.6	
<i>Kambuzi</i>	<i>Hamplochromis species</i>	3.6	
<i>Chisawasawa</i>	<i>Tramitichromis spp</i>	2.0	
<i>Kampango</i>	<i>Bargus Meridonalis</i>	1.9	<i>Critically endangered/ Listed</i>
<i>Mlamba</i>	<i>Clarias Species</i>	2.3	
<i>Usipa</i>	<i>Engraulicypris sardella</i>	61.5	<i>Least concern</i>
<i>Ntchila</i>	<i>Potamodromous species</i>	0.7	
<i>Mpasa</i>	<i>Opsaridium microlepis</i>	0.9	<i>vulnerable</i>
<i>Sanjika</i>	<i>Opsaridium</i>	1.1	<i>Least concern</i>
<i>Mbaba</i>	<i>Bucchromis spp</i>	3.2	
<i>Mcheni</i>	<i>Rhaphochromis spp</i>	6.2	

Source: Nkhotakota SEP, 2017; National Parks & Wildlife (Protected, endangered and listed species) (declaration) order, 2017; IUCN Red List of Threatened Species, 2017.

The Benga to Dwangwa road project has presence of these endangered fish species and the project proponent should ensure to implement appropriate mitigation measures to protect their habitats and populations. These measures should include:

- Establishment of buffer zones around water bodies to safeguard critical fish habitats from construction activities and pollution.
- Implement erosion and sediment control measures, to prevent sedimentation in water bodies, which can negatively impact fish spawning grounds and breeding habitats.
- Construct bypass channels or fish ladders where necessary to facilitate fish migration past construction sites and artificial barriers, as identified through detailed habitat assessments.
- Monitor and maintain water quality standards, ensuring suitable conditions for fish survival and reproduction during construction activities.

- Conduct regular ecological monitoring of fish populations and habitats, to assess health and inform adaptive management strategies.

5.3.1.6. Reptiles

The reptile survey conducted in the project sites along the Benga-Dwangwa M005 road section in Malawi identified a total of 21 reptile species. Notably, the majority of these species are categorized as "Least Concern" in terms of conservation status, underscoring the robustness of this reptilian fauna. However, it's important to highlight that one species, *Python sebae*, is listed as "Nearly Threatened" on the IUCN status.

Table 21 provides an overview of reptile species distribution by family, highlighting the number of species within each family and their respective percentage representation. It reflects the diversity of reptilian fauna in the project area.

Table 21. Species Richness per Family

Number	Order	Family	Species	Common Name
1	Squamata	Elapidae	Dendroaspis polylepis	Black Mamba
2	Squamata	Elapidae	Naja nigricollis	Black -necked Spitting Cobra
3	Squamata	Gekkonidae	Lygodactylus capensis capensis	Common Dwarf Gecko
4	Squamata	Chamaeleonidae	Chamaeleo dilepis-dilepis	Common Flap-necked Chameleon
5	Squamata	Psammophiidae	Psammophis orientalis	Eastern Yellow-bellied Sand Snake
6	Squamata	Gekkonidae	Hemidactylus platycephalus	Flat-Headed Tree Gecko
7	Squamata	Colubridae	Philothamnus hoplogaster	Green Water snake
8	Squamata	Crocodylidae	Crocodylus niloticus	Nile Crocodile
9	Squamata	Colubridae	Thelotornis capensis oatesii	Oates' Vine Snake
10	Squamata	Psammophiidae	Psammophis mossambicus	Olive Grass Snake
11	Squamata	Pelomedusidae	Pelusios subniger	Pan Hinged Terrapin
12	Squamata	Agamidae	Agama armata	Peters'Ground Agama
13	Squamata	Viperidae	Bitis arietans	Puff adder
14	Squamata	Scincidae	Trachylepis margaritifer	Rainbow Skink
15	Squamata	Pythonidae	Python natalensis	Southern African Python
16	Squamata	Elapidae	Philothamnus semivariegatus	Spotted Bush Snake
17	Squamata	Lygosomatiinae	Trachylepis striata	Stripped Skink
18	Squamata	Scincidae	Trachylepis varia	Variable Skink

Number	Order	Family	Species	Common Name
19	Squamata	Varanidae	Varanus niloticus	Water Monitor
20	Squamata	Psammophiidae	Psammophis subtaeniatus	Western Yellow-bellied Sand Snake
21	Squamata	Gerrhosauridae	Gerrhosaurus flavigularis	Yellow-throated plated Lizard

Table 22. Shows species Richness per Family

Family	No of species	% / Family
Agamidae	1	4.761
Chamaeleonidae	1	4.761
Colubridae	2	9.523
Crocodylidae	1	4.761
Elapidae	3	14.285
Gekkonidae	2	9.523
Gerrhosauridae	1	4.761
Lygosomatiinae	1	4.761
Pelomedusidae	1	4.761
Psammophiidae	3	14.285
Pythonidae	1	4.761
Scincidae	2	9.523
Varanidae	2	9.523

Figure 36 is a graph visually illustrates the distribution of reptile species across different families encountered during the survey. It emphasizes the dominance of the Elapidae and Psammophiidae families within the reptile community.

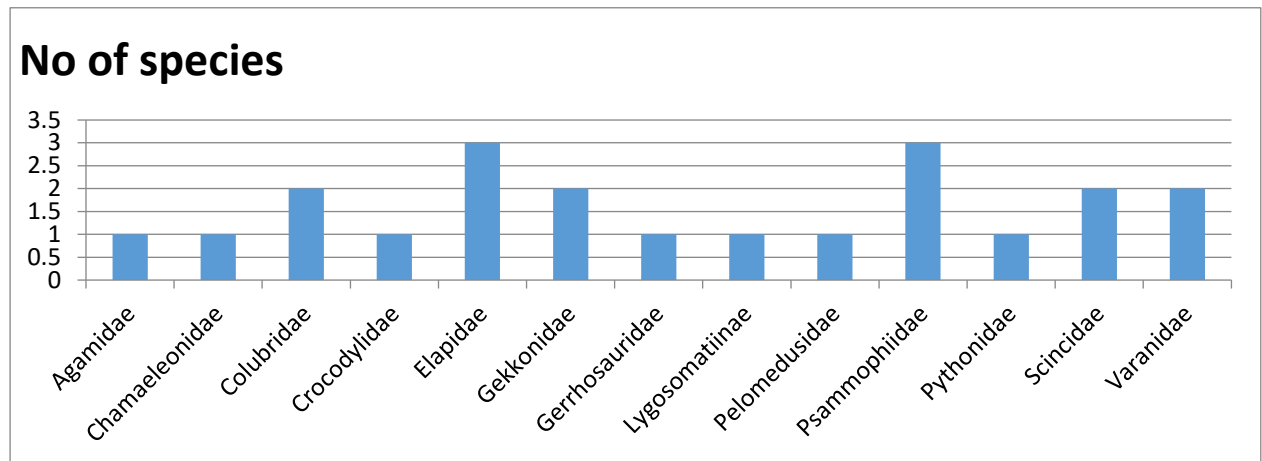


Figure 36. Number of Species per Family

Figures 37 present images photographic records of some reptile species encountered during the survey, offering visual insights into the reptilian diversity in the project area.



Yellow-throated plated Lizard



Western Yellow bellied Sand Snake



Trachylepis syriata



Hemidactylus platycephalus



Black Mamba shieth



Common Dwarf Gecko



Peter' Ground Agama



Puff Adder



Rainbow Skink



Naja nigricollis

Figure 37. Photographic records of some reptile species encountered during the survey

5.3.1.7. Amphibians

The amphibian survey conducted in the project sites along the Benga-Dwangwa M005 road section in Malawi identified a total of 5 amphibian species. Importantly, all of these species are categorized as "Least Concern" on the IUCN status, indicating a healthy and stable amphibian population in the area. Table 23 provides an overview of amphibian species distribution by family, highlighting the number of species within each family and their respective percentage representation. It reflects the diversity of amphibian fauna in the project area.

Table 23. Species Richness per Family

No	Order	Family	Spices	Common Name
1	Anura	Ptychadinida e	Ptychadena anchieta	Anchieta Rigged Frog
2	Anura	Ptychadinida e	Ptychadena porosossima	Grassland ridged Frog
3	Anura	Bufonidae	Bufo Gutturalis	Guttular Toad
4	Anura	Microhylidae	Breviceps mossambicus	Mozambique rain frog
5	Anura	Pipidse	Xenopus muelleri	Muller's Plantanna
6	Anura	Ptychadinida e	Ptychadena upembae	pemba ridged frog
7	Anura	Ptychadinida e	Ptychadena subpunctata	Spotted Rigged Frog
8	Anura	Hyperoiidae	Hyperolius tuberilinguis	Tinker Green frog

Table 24. Shows the species richness in the projects sites that was sampled

Family name	No of species	% / Family
Bufonidae	1	12.5
Hyperoiidae	1	12.5
Microhylidae	1	12.5
Pipidse	1	12.5
Ptychadinidae	4	50
	8	100

Figure 38 shows a graph visually illustrates the distribution of amphibian species across different families encountered during the survey. It emphasizes the prevalence of the Ptychadinidae family in the amphibian communit.

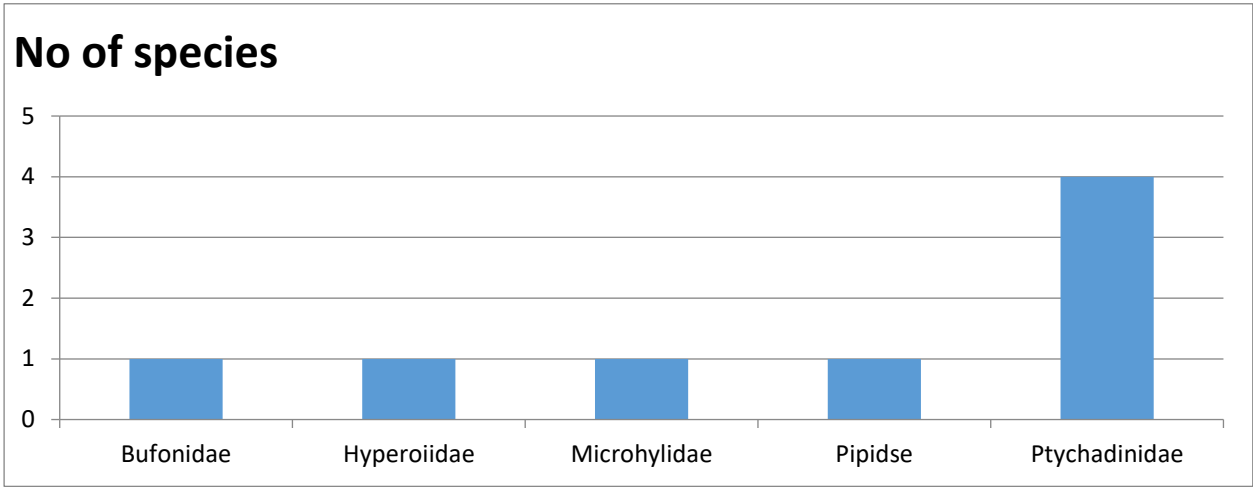


Figure 38. Number of Species per Family of Amphibian.

Figure 39 presents a photographic records of some amphibian species encountered during the survey, offering visual insights into the amphibian diversity in the project area.



Figure 39. Photographic records of some amphibian species encountered during the survey.

5.3.2. Sensitive Habitats

There are four sensitive areas that the study identified that fall in the general project area: Chia Lagoon falling under Phase I of the project, Nkhotakota Wildlife Reserve (NWR) & Bua River falling under phase II, and Lake Malawi stretching across Phase I and Phase II of the project area. Chia and Bua bridges are among the bridges to be retained by the rehabilitation project, thus they Chia Lagoon and Bua River will not be directly affected by project works. Similarly Lake Malawi, despite running the length of the project road, falls way outside the road reserves within which project activities will be confined.

5.3.2.1. Nkhotakota Wildlife Reserve.

The Nkhotakota Wildlife Reserve (NWR) is the oldest (1938) and largest (1,802 km²) Wildlife Reserve in Malawi, covering a broad extent of escarpment wilderness, extending toward the Lake Malawi shore plain. The terrain is hilly and deeply dissected by drainage lines and slopes from west to east down the escarpment. According to NWR management, the vegetation in the reserve is largely Miombo woodland consisting of many *Brachystegia* and *Julbernardia* species, and is a BirdLife International-designated International Bird Area (IBA) providing habitat or seasonal breeding grounds to over 280 bird species. Some of the mammal species present in the reserve include elephant, buffalo, leopard (only three remaining), roan, sable, zebra, baboon, antelope, eland and waterbuck. Dwangwa, Bua and Kaombe are the major rivers through the wildlife reserve and provide breeding grounds for lake fish like mpasa, NWR management asserted that mpasa fish used to breed in 10 of the Districts Rivers but now only Bua remains conducive for the upstream seasonal migration of the fish for breeding.

The Benga-Dwanga M005 stretch crosses through NWR from Bua Bridge to a distance of about 5km northwards (*Figure 40*); on the west is the reserves wildlife containment wire running parallel to the road, and on the east is the buffer zone that is provided between human settlements and wildlife to prevent human-wildlife conflict.

NWR works with community structures under the Nkhotakota Wildlife Reserve Association (NWIRA) which works with district council structures going down to village development committees (VDCs). NWIRA is currently running a natural resource conservation project,

supporting farmers through seed distribution for grains and cassava, livestock pass-on schemes, and promoting tree planting and supporting beekeeper.

Being an already existing bitumen road passing outside the reserve's containment wire, the scope of M005 rehabilitation works will not have significant effects on wildlife in the NWR since the works will be confined within the already provide road reserve boundaries.

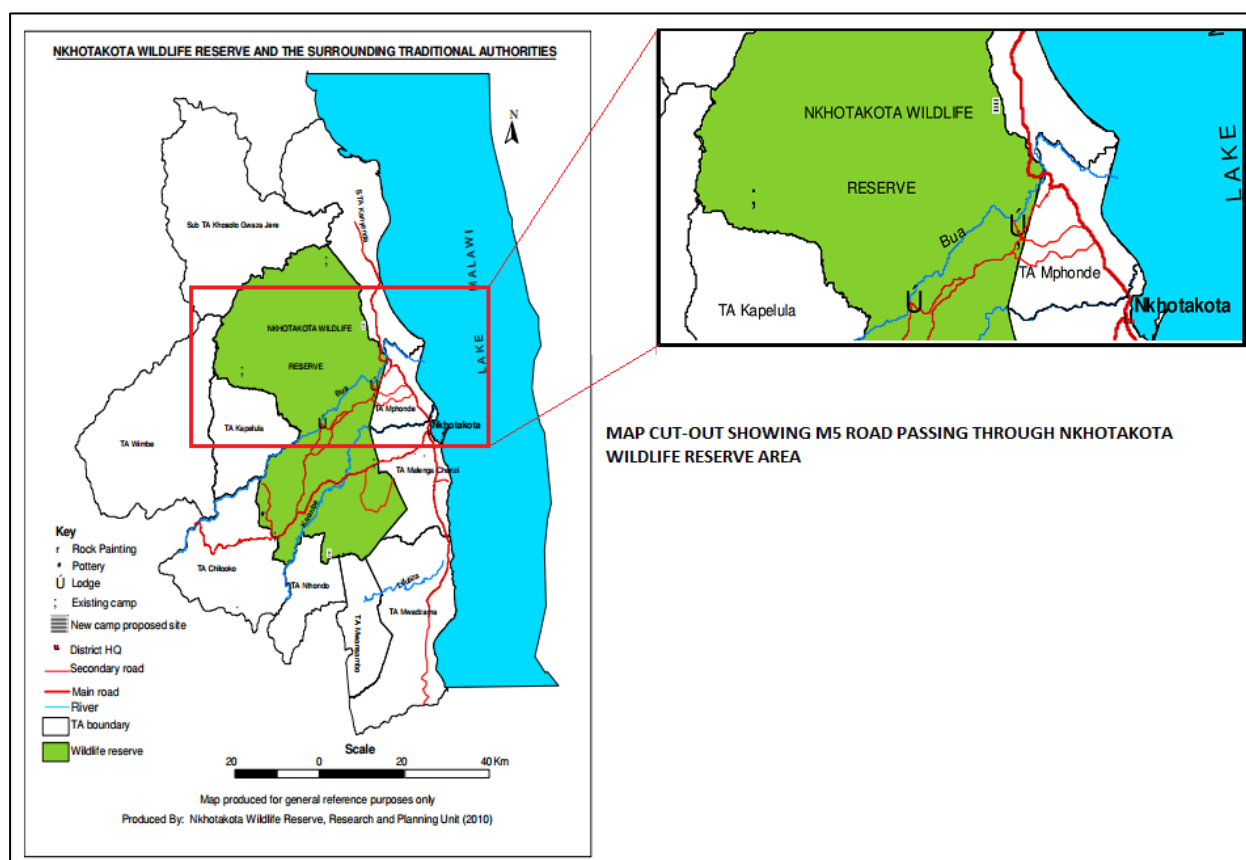


Figure 40. Map showing the road section that passes through NWR area.
 (Source: Environmental and Social Management Framework, Effective
 Management of Nkhosakota Wildlife Reserve Project)

5.3.2.2. Lake Malawi

Another sensitive environment is the project area is Lake Malawi which is the main drainage basin for the district and caters for a vast catchment area. It is the ninth largest freshwater lake on Earth by surface area at 29,500 km², and the third deepest with a maximum depth of 700 m and average depth of 264 m.

Lake Malawi is renowned for its biodiversity, hosting over 800 fish species, making it the most fish species-rich lake globally. The southern part of the lake, within Nkhota-Kota District, falls under protection as part of the Lake Malawi National Park, designated as a UNESCO World Heritage Site. While the section of the lake within the project area is not legally designated as a protected area, it remains an essential habitat for aquatic life and a crucial component of the region's ecological system for both plant and animal life.

The lake is the major fishing ground for the district and is home to different fish species including Chambo (*Oreochromis Karongae*), Mpasa (*Opsaridium microlepis*), Nsanjika (*Opsaridium microcephalus*), Usipa (*Engraulicyprissardella*), Utaka (*Copadichromis species*), and mcheni (*Rhaphochromis spp*). The lake also supports populations of mammals, birds, amphibians, reptiles and plants.

The prevailing social and biophysical conditions present a threat to the lake's ecological system as indicated by a decreasing trend in the relative catch per unit effort (Rel. CPUE) from 2011 up to 2019 (*see Table 25*). This was mainly due to issues of climate change, overuse of resources, use of destructive fishing gear and methods, introduction of invasive plant and animal species, habitat loss, and pollution. None the less, relative CPUE has picked between 2020 and 2021; meaning relatively less effort is used to catch more fish, indicating a shift from over fishing to sustainable fishing. The department of fisheries attributes this to interventions by the department and other development partners such as RIPO Africa towards management of fish resources which have resulted in reduction of illegal fishing methods and improved management of breeding grounds through the beach village committees. Through these interventions there is more fish in the lake. None the less, three out of the four species of Chambo (*Oreochromis karongae*, *Oreochromis squamipinnis*, *Oreochromis lidole*) are listed as Critically Endangered (IUCN 2017).

It is crucial to note that while the road project stretches alongside Lake Malawi, the project activities will be confined within the designated road reserves and will not directly impact the lake. Therefore, measures will be implemented to ensure the conservation and protection of Lake Malawi's ecological integrity alongside the road rehabilitation efforts.

Table - 25. Nkhotakota total landed fish catch by year

YEAR	TOTAL LANDED CATCH	Fishing Efforts	CPUE	Rel. CPUE
2011	22041	6149	3.6	1.8
2012	27310	11834	2.3	1.2
2013	27441	10950	2.5	1.3
2014	27179	17392	1.6	0.8
2015	27703	19171	1.4	0.7
2016	36467	20282	1.8	0.9
2017	44099	36496	1.2	0.6
2018	28345	13834.37	2.05	1.02
2019	27029	13805	1.96	1.0
2020	27309.76	11916.22	2.3	1.1
2021	34898.76	11068.53	3.15	1.6

Source: District Fisheries Office, 2022

5.3.2.3. Chia Lagoon

Chia Lagoon is the fifth largest water body in the country, covering a total area of 11.1 km². It spans 8 km in length and 2 km in width, with a maximum depth of about 17 m. The lagoon is connected to Lake Malawi through a 600 m long and 50 m wide channel. The main rivers draining into Chia Watershed, covering over 900 km², are Lufiliza, Likao, and Bambara. The lagoon hosts 24 fish species across 7 families (Characidae, Cyprinidae, Mormyridae, Cichlidae, Bagridae, Clariidae, and Mochokidae), while its habitat is not conducive to other large animals. Crocodiles and amphibians are among the other aquatic animals present. For the surrounding community, the lagoon serves as a major source of fish and irrigation water, attracting tourists and benefiting the local economy.

Despite its critical ecological importance, Chia Lagoon is yet to be designated as a legally protected area. Currently, its management primarily falls under the Ministry of Agriculture, specifically the Department of Fisheries, which collaborates with the Irrigation Department.

According to Nkhotakota fisheries department, prevailing environmental issues associated with the lagoon include siltation caused by poor farming practices in upland communities, threatening to dry up the lagoon in future; deforestation of the beach and upland resulting from opening up of more farm land which in turn is increasing soil erosion; use of unsustainable fishing methods like poisonous herbs (kapute) and mosquito-nets and; rice farming in shallow areas of the lagoon, further contributing to the siltation problem.

Presently, the Fisheries Department manages the 'Fish for Tomorrow' project in the area, funded by RIPO Africa. The project focuses on environmental conservation of fish and trees, discouraging cultivation near the beach, preventing waste dumping, and discouraging devastating fishing practices. The department collaborates with 14 beach village committees around the lagoon to manage fishing spots, with interventions resulting in increased fish production.

It is important to note that while the road project passes near Chia Lagoon, the project activities will be confined within designated road reserves and will not directly impact the lagoon. Measures will be implemented to ensure the conservation and protection of Chia Lagoon's ecological integrity alongside the road rehabilitation efforts.

5.3.2.4. Bua River

Bua River is the largest river to enter Lake Malawi on the Malawi side from the Central African Plateau, having a considerable length of its lower descent protected in the NWR before reaching the M005 crossing. The river which runs a length of 250 km, draining a 10,654 km² watershed, has several rapids and falls and is a habitat to many species of fish including the Lake Salmon (*Opsaridium microlepis*, locally known as mpasa). Large breeding runs of the Lake Salmon, endemic to Lake Malawi, ascends the Bua River to spawn from March to July. Various species of yellow fish also use the same spawning grounds.

According to NWR management, Bua River is considered an endangered habitat since it is the only river in the district providing breeding grounds to mpasa fish. The fish used to breed in 10 rivers in the district but the other rivers are no longer conducive due to extensive riverbank erosion resulting from deforestation and crop cultivation along the rivers.

5.4. Socio-Economic and Cultural Environment

5.4.1. Present projected population

According to 2018 Malawi Population and Housing Census Report, the district's population was at 393,077 with 192,615 males and 200,462 females representing 49% and 51% of the total population respectively. According to the district's Implementation Plan (DIP

2023) the current population is projected to be slightly over 444,408. Population of Traditional authorities through which the road section is passing represents 79% of the district's total population.

5.4.2. Land Use

5.4.2.1. Land tenure system.

According to the new land Act 2022, Land is being categorized as public land, private and customary land. Public land is classified either as Government land or unallocated customary land, while private land is classified as freehold, leasehold or customary estate. The Land Act of 1964 categorized land into Public Land, Private land and customary land. Whereas public land was defined as land that is being used by the government and the public infrastructures such as government schools, hospitals, public roads and national parks. Private land was defined as land registered under the Registered Land Act and further classified into Leasehold and Freehold land title. While customary land was defined under the Customary Land Act as land that is in the hands of the chiefs and can only be held used by the people living under the chiefs.

In Nkhotakota district, only Traditional Authority Mwasambo has seen the rolling out of the new land act in the pilot phase; all the TAs in the project area are still using the old land laws, with land ownership distributed among public land (3%), leasehold land (17%), freehold land (26%), and customary land (54%).

According to the designs, the road construction activities will be mainly restricted within the M5 road reserve boundaries which is public land; none the less, due to encroachment, the project will result in displacement of people both physically and economically.

5.4.2.2. Land use distribution

Nkhotakota district covers 433, 800 ha of land being utilized for wildlife conservation, customary land forestry, cultivation and infrastructure development.

The district has Nkhotakota wildlife reserve (NWR) with 178,568 ha of forest cover (out of the total 180,000 ha) running across Traditional Authorities Malengachanzi, Mphonde,

Mwansambo and part of Kanyenda; and northwards beyond Dwangwa is Dwambazi forest Reserve covering 3,660 ha, taking part of Traditional Authorities Kanyenda and Kafuzira. Across the district, customary land forestry areas consisting of either planted or natural woodlots take up 38,289 ha. In total forest area takes up about 58% of the districts land cover.

The bulk of the remaining land (31% of total district land cover) is used for crop production under both rain fed and irrigation farming. The rest of the land is used for settlement, public infrastructure development and private infrastructure development.

Specifically on public land falling in the M5 road reserve, land use ranges from housing, built-up business spaces, informal markets, crop production, forestry, and communal facilities like boreholes, graveyards and worship centres.

5.4.3. Agriculture

There are five extension planning areas (EPAs) through which the Benga-Dwangwa M5 road section is passing: Ntosa, Zidyana, Linga, Mphonde and Nkhunga EPAs. Major crops grown across these EPAs include maize, cassava and rice, which is mainly grown as a cash crop. Major types of livestock found in these EPAs include cattle, goats, sheep, pigs and chickens.

The EPAs have a differential agricultural land use. The dambo land along the lake is used for sugarcane production, rice production, and winter crops production through irrigation and utilization of residual moisture. The arable land is used for growing different crops and keeping of different livestock species as highlighted above. The upper land is used for grazing and cultivation of some crops like groundnuts and Tobacco. Zidyana EPA received heavy rains when the maize crop was drying up which resulted in losses to rottenness (District agriculture office, 2023). Mphonde EPA registered significant loss of production because fertilizer under the input subsidy programme was distributed very late. Table 26 outlines the food insecurity situation in the different EPAs, detailing the number of farming households and the corresponding number of food-insecure households, along with the percentage of food-insecure households in each EPA.

Table 26. Food insecurity by EPA.

EPA	Number of farming Household	Number of food in Household	percentage
Nkhunga	25,319	983	4%
Mphonde	9,636	1,253	13%
Linga	30,423	922	3%
Zidyana	18,858	2,452	13%
Ntosa	11,641	565	5%

Table 27 provides insights into the types of crops cultivated and livestock reared in each EPA. It highlights both crops grown for cash and those for sustenance, as well as the variety of livestock species present.

Table 27: Crops, livestock

	crops for Cash	other crops	livestock
NTOSA: chiluwa to Lipsozi river	Rice, soya beans, groundnuts, green maize	Maize, beans	chickens ,goats ,pigs ,cattle and sheep
ZIDYANA: Lipsozi to Chia river	Rice, green maize	Maize, Cassava, , Sweet potato	Cattle, Goat, Pig, Sheep & Chicken
LINGA: Chia to Kaombe river	Rice, sugarcane, Ground nuts, Soya beans, green maize	Maize, rice, cassava, sweet potatoes,	Goats, cattle , sheep, Chickens, ducks, rabbits and pigs
MPHONDE: Kaombe to Bua river	rice, sweet potato, groundnuts, sugarcane, green maize	Cassava, Maize,	goats, sheep, chicken, cattle
NKHUNGA: Bua to Luluzi river	Rice, Groundnuts, sugarcane and Tobacco, green maize	Maize, Cassava,	Cattle, Goats, Sheep, Pigs and Chickens

Table 28 documents natural disasters that impact agriculture in the project area. These include floods, dry spells, wind-associated rainfall, crop pests and diseases, and animal pests and diseases, along with their specific occurrences in each EPA.

Table 28. Natural disasters affecting agriculture in project area

NATURAL DISASTER	OCCURRENCE
Floods	Floods experienced along major rivers in all EPAs
Dry spells	Dry spells occur during the onset of the rainy season and towards the month end of January to mid-February each season – experienced in all EPAs
Wind	Rainfall sometimes is associated with hailstorm wind but not intensive
Crop pests & diseases	<p>Ntosa & Zidyana EPAs Pests: Fall army worm, Aphids, elegant grasshoppers; Diseases: Mosaic virus diseases</p> <p>Linga & Mphonde EPAs Fall Armyworm in maize; Banana Bunchy Top Virus; Cassava Mosaic Virus Disease in cassava;</p> <p>Nkhunga EPA Pests – African Army Worm; Fall army Worm; White flies; Elegant grass hoppers; Aphids. Diseases – BBTVD; Rosette; Blight; Smart</p>
Animal pests & disease	<p>Ntosa & Zidyana EPAs Pests: mostly attacked by ticks, flukes, worms & fleas; Diseases: New castle, African Seine fever</p>

	<p>Linga & Mphonde EPAs</p> <p>New Castle Disease in termed birds i.e. Chicken</p> <p>Nkhunga EPA</p> <p>ASF – livestock disease</p>
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5.4.4. Planned development activities

Following the public sector reforms being implemented national wide, Nkhotakota district in 2020 developed a strategic plan of sorts dubbed ‘Public Reform Areas’, providing a road map for the district’s development activities. Outlined priority reform area include local revenue enhancement, tourism development, industrial park and up town plots, governance, information and communication technology and fishing industry. In particular, the Council aimed to:

- ✓ improve local revenue collection and broaden revenue base
- ✓ promote tourism in the district
- ✓ promote infrastructural & economic development
- ✓ improve governance
- ✓ improve access to information
- ✓ promote fishing industry

5.4.4.1. Local Revenue Enhancement

Activities planned for local revenue enhancement include development of a mega farm and produce marketing, which will promote commercial farming activities that are economically viable and sustainable; introduction of paying wing at Nkhotakota District hospital aimed at reducing congestion of people on non-paying hospital services and improving hospital/council revenue, and; introduction of electronic gadgets for ticketing service (E-ticketing) in all its markets to improve revenue collection, accountability, flexibility and security.

The hospital paying wing and the e-ticking system are now up and running.



Figure 41 The Nkhotakota district proposed Mega Farm (Source: Nkhotakota district council, public sector reform areas).

5.4.4.2. Tourism development

Planned activities on tourism development will cover development of a tourism City on Sungu Split situated inside the Lake Malawi, 1.5 km from the shores; development of historical sites such as Livingstone tree, where slave trade was abolished, as a way of promoting local culture, preserve history, improving council's revenue, increasing job opportunities and contributing to foreign exchange of the transactions; development and promotion of the district's water bodies for tourism and water sporting activities; development of the hot spring sites by constructing hot-spring shower rooms to help provide hygienic hot-spring shower room services, improve revenue generation and improve the surrounding environment, and; promotion of the already existing Nkhotakota Wildlife Reserve being managed by African Parks.

as regards to the promotion of NWR, the council has engaged the African Parks and are together working on a tourism development plan in partnership with USA forest services; among other things, the plan includes development of cultural villages in communities bordering the reserve to be part of the ecotourism and in turn increase economic benefits

that surrounding communities can derive from the wildlife reserve (stakeholders' workshop).

5.4.4.3. Industrial Park

The council also plans to develop an industrial park which will incorporate modern business and tourism parks aimed at stimulating economic growth through job creation, infrastructure development and creating more urban communities.

5.4.4.4. Governance

In the area of governance, the focus will be on formulation of by-law for various areas needing regulations, development of service charters for all sectors in the Council and, development of strategic plan.

5.4.4.5. Information and Communication Technology

On information and communication technology, activities will include creation of a website for Nkhotakota District Council which will help to reach to the residents in terms of dissemination of important information; and installation of small network towers in different places such as bus depot, offices, institutions and recreation centres, to secure free WI-FI for the district so that the residents should have free access to much-needed information.

5.4.4.6. Fishing Industry

Lastly, for the fishing industry, planned activities include introduction of cage fish farming that will help to increase fish production without damaging wild stocks; and the setting up of Fish factories for fish processing and packaging.

5.4.5. Community structures

The basic community level governance structures are area development committees (ADC) at traditional authority level, and village development committees at group village level. In all the six T/As through which the road is crossing, these structures are available and functioning. Table 29 below shows a total of 53 VDCs along the targeted road section falling under six ADCs.

Table 29: Group village heads falling under TAs within targeted road section.

	Kanyenda ADC	Malengachanzi ADC	Mphonde ADC	Kalimanjira ADC	Nkhanga ADC	Mwadzama ADC
1	Pikapika	Vinthenga	Pendwe	Kalimanjira	Chongole	CHilupula
2	Aaron (Senior group),	Makuta	Mvula	Ntanga 1	Chiko	Bango
3	Sinde	Ng'oma	Chintambo	Ntanga 2	Ngwata	Kabyanga
4	Mbuluma	Kamange	Mphonde	Chikho		Chioza
5	Maluma	Ntenje	Chiboko	Mkombe		Nkhala
6	Chia	Mbaluku	Selemani			Benga1
7	Katapila	Malengachanzi	Ntonya			Chakaka
8	Matelezi	Kawelama	Ntumbula			
9	Tito	Chota	Petro Duwa			
10	Longwe	Chiutula				
11	Mbeliphaso	Chinthumbwi				
12	Chimtumbuka	Chamba				
13	ng'ongo	Nkhandwe				
14	Mbuna					
15	Nkhunga					
16	Kanyenda					

Source: Social Survey, ADCs reps FGD

Another community structure that may directly be affected by the road rehabilitation project is the market committee. There are several trading centers along the Benga - Dwangwa M005 road stretch which are mostly managed by market committees; major trading centres among these include Nkhotakota Boma, Mkaika, Lozi, Liwalazi, Matiki and Dwangwa. Other community structures identified through focus group discussions are listed in Table 30 according to general area of focus. According to the district forest office there are 100 village natural resources management committees (VNRMC) between Benga and

Dwangwa which are responsible for the management of village forest areas; these are the same committees that community FGD participants referred to as village forest committees.

Table 30. Community structure by sector.

CATEGORY	COMMITTEE/GROUP
Agriculture	Village Agriculture committee VAC
	Beach village committee BVC
Environmental	Village forest committee VFC
	Catchment area management committee CAMC
	Village natural resource management committee VNRMC
Health	Community health action groups CHAG
	Village health committee
	Care groups
	Market health committee
Education	School committee
	Parent teacher association PTA
	Mother groups
Water	Borehole committee
Civil rights and protection	Village rights committee
Business related groups	Market committees

Source: Social survey, Community FGDs

5.4.6. Education

The district stands at 65% literacy against the nation's 68.6%, with 51% of the literate being the male population of age 5 and above (NSO 2018). The district is divided into 17 educational zones with 174 primary schools and 25 secondary schools. Enrolment for

2021/2022 academic year was at 61,617 boys and 62, 907 girls, representing a 49% and 51% gender distribution respectively. Average drop-out rate is 6.2%, with boys at 6.1% and girls at 6.4%. District education management information system (DEMIS) dropout data was not available to compare with latest enrolment figures.

Table 31: Enrollment and drop-out rates for Nkhotakota primary and secondary schools by gender

	Government	Private	Total
Primary schools	165	9	174
Secondary schools	20	5	25
enrollment	Boys	Girls	Total
	61,617	62,907	124,524
Drop-out rate	6.1%	6.4%	AVG= 6.2%

Source: Nkhotakota district education CEO 2022

The road section under the proposed rehabilitation project passes through 14 out of the district's 17 education zones; 28 primary and 11 secondary schools fall within 1 km radius of the road; these will be directly or indirectly affected by the rehabilitation of the road, especially during construction phase.

Table 32: Primary schools falling within 1 km radius of the M5 road from Benga to Dwangwa

No	ZONE	SCHOOL	2023 Enrolment		
			Boys Total	Girls Total	Grand Total
1	Boma	Chisoti	596	605	1201
2	Boma	Nkhotakota CCAP	1147	1229	2376
3	Boma	Nkhotakota LEA	1022	1240	2262
4	Boma	St Pauls	1292	1275	2567
5	Chididi	Chia	866	847	1713
6	Chididi	Kayadzi	612	648	1260

No	ZONE	SCHOOL	2023 Enrolment		
			Boys Total	Girls Total	Grand Total
7	Chipando	Kamwala	218	193	411
8	Chipando	Msenjere	296	340	636
9	Kabiza	Kabiza	572	550	1122
10	Kabiza	Liwaladzi	996	1012	2008
11	Kabiza	Majiga	559	561	1120
12	Kanyenda	Dwangwa	1576	1749	3325
13	Kanyenda	Kanyenda	1794	1839	3633
14	Kasipa	Kasipa	476	490	966
15	Kasipa	Phakwe	987	1055	2042
16	Lozi	Chanthomba	474	458	932
17	Lozi	Chombo	649	643	1292
18	Lozi	Lozi	771	770	1541
19	Mkaika	Chibothera	310	341	651
20	Mkaika	Chinkhwamba	517	500	1017
21	Mkaika	Chongole	505	498	1003
22	Mkaika	Matamangwe	992	1157	2149
23	Mpondagaga	Chilumba	541	576	1117
24	Mpondagaga	Mpondagaga	505	479	984
25	Walemera	Mdyankhanga	453	422	875
26	Walemera	Mpandawadothi	248	239	487
27	Walemera	Msangu	190	200	390
28	Walemera	Walemera	398	413	811

Source: Nkhotakota district education CEO 2022

Table 33. Secondary schools falling 1 km radius of the M5 road in the project area.

	School Name	2023 enrolment		
		TOTAL M	TOTAL M	GRAND TOTAL
1	NKHOTAKOTA SECONDARY	382	250	632
2	BISHOP MTEKATEKA PRIVATE	370	314	684
3	BENGA CDSS	136	145	281
4	MPONDAGAGA	72	79	151
5	NKHOTAKOTA COLLEGE	134	87	221
6	LINGA CDSS	408	415	823
7	WALEMERA DAY	187	206	393
8	LIWALADZI CDSS	156	161	317
9	MAJIGA CDSS	141	161	302
10	LOZI DAY	192	186	378
11	MSENJERE	129	97	226

Source: DEMIS 2023

Other schools that fall in proximity to and may be disrupted by the projects are those relative away from M005 road but along the identify feeder roads as indicated in Table 34 below.

Table 34. Schools along Feeder Roads in Proximity to the Project

ZONE	SCHOOL	FEEDER ROAD
Chipando	Chipando LEA School	Nsenjere turn off to Nsenjere
Mkaika	Mkaika TDC	Mwansambo turn off to kayoyo
Mkaika	Mkaika CDSS	Mwansambo turn off to kayoyo
Chididi	Chididi TDC	Kalimanjira to Chididi health centre

5.4.7. Health

With a project population of 444,408, Nkhotakota district has fertility rate is at 6.0, birth rate at 45.29%, and mortality rate at 9.39/1000. Problems associated with these demographic trends include increased OPD attendance leading to high consumption of medical supplies; and high case load putting pressure on limited staff and health facilities.

Current mortality for under 1 and under 5 is at 41/1000 and 64/1000 respectively, while morbidity and disability based on OPD attendance totals 1656 per 1000.

According to district environmental health office, the major health issues in the district include HIV/AIDS, malaria, STIs, tuberculosis, acute respiratory infection (ARI) and diarrhea.

Table 35: Prevailing Health Issues for Nkhotakota DHO

HEALTH ISSUE	STATUS	
	2020	2022
HIV/AIDS	Positivity Rate - 6.4%; Prevalence - 7.2%	Positivity rate – 2.1%
MALARIA	691/1000	705/1000
STI	17.4/1000	16/1000
TB	Prevalence rate = 12.6%	0.058%
ARI	35%	64%
DIARRHEA	42.08%	17.3%

Source: DEHO, Nkhotakota DHO 2020, HMIS 2023

The district registered a total of 1477 confirmed COVID-19 cases as of February 2022, out of 8293 cumulative tests conducted; representing a 17.81% confirmation. As of December 8, 2023, cumulative confirmed cases were at 1522 out of 8498 cumulated tests so far conducted (DHO); this represents 17.91% confirmation. This means that COVID-19 is no longer a health concern in the district.

An emerging health issue from February 2022 to date has been cholera which has since abated; the district had, as of 8 December 2023, registered 1475 cumulative cases, 1415 cumulative discharges and 58 cumulative deaths.

Other health issues previously not captured in the report include trypanosomiasis and scabies. Trypanosomiasis is considered not because of its prevalence but its uniqueness in that it is not common in most parts of the country, with registered cases in Nkhotakota, Rumphi, Ntchisi and Kasungu. Cause by protozoans transmitted mainly through tsetse flies commonly found in NWR reserve in the district, the trend of registered cases has generally been consistently stable (Table 36).

Table 36. Registered Cases.

Year	Registered Tryps cases
2019	31
2020	25
2021	39
2022	26
2023	17

The DHO was able to provide data on scabies, despite being listed as one of the prevailing health issues that was previously missed out in the ESIA report.

The project area boasts a comprehensive network of 20 health facilities, each playing a vital role in delivering healthcare services to the community. This diverse range of facilities is categorized based on ownership and type, ensuring a broad spectrum of medical care is accessible to the population.

Ownership of these facilities varies, encompassing five under the Christian Health Association of Malawi (CHAM), six operated by the government, and the remainder comprising a mix of private entities and public-private partnerships. This diversity ensures that both public and private healthcare needs are adequately met.

Among these facilities, we have community hospitals, health centers, dispensaries, clinics, and a district hospital. Notably, community hospitals like Alinafe (CHAM) and significant health centers such as Mtosa (Government) and Bua (Government) serve as key pillars in the region's healthcare infrastructure. Additionally, specialized facilities like the Nkhotakota Dental Clinic address specific health concerns.

Table 37. Health Facilities in the Project Area by Ownership and Type

Seri al No.	Name of facility	Ownership	TYPE
1	Mtosa	GVT	Health centre
2	Alinafe	(CHAM)	Community Hospital,
3	Benga	(GOVT)	Health Center,
	Kapiri	(CHAM)	Health Center,
4	Shukurani	IHAM	Dispensary
5	Chididi,	(CHAM)	Health Center
6	Mpamantha	(GOVT)	Health Center,
7	St. Annes,	(CHAM)	hospital
8	Hossana	PVT	clinic
9	Nkhotakota Dental	PVT	clinic
10	Nkhotakota	(GOVT)	District Hospital
11	BLM	PVT	clinic
12	Innocent Souls	PVT	Clinic
13	Medical Fund for Children	NGO	Clinic

Seri al No.	Name of facility	Ownership	TYPE
14	Bua	(GOVT)	Health Center,
15	Msenjere,	(GOVT)	Health Center
16	Liwaladzi	(CHAM)	Health Center,
17	DCGL,	(Public Private)	Dispensary
18	Matiki,	(Public Private)	Health Center
19	Nkhunga	(GOVT)	Health Center,
20	Kaongozi	GVT	Health Centre

However, it's important to note that the staffing levels for 15 of these facilities as seen in Table 37, especially the private ones, are not comprehensively documented. This gap in data, identified in the Nkhotakota District Health Office (DHO) records, points to a need for improved information management to better understand and address the healthcare needs in the area.

Table 38: Staffing levels for health facilities along the Benga-Dwangwa M5 stretch.

No.	facility	Nurses	Clinical staff	Environmental staff	Administration	Ground labours	HSAs	Hospital/patient attendants	Incinerator operator	Mortuary attendant	Others
1	Ntosa	3	1	0	0	2	9	5	0	0	0
2	Benga	3	2	1	0	1	12	5	0	0	0
3	Alinafe	10	2	0	1	5	12	9	0	0	2 Home craft worker
4	Chididi	3	1	0	0	2	9	3	0	0	0
5	Mpamantha	3	1	0	0	2	9	5	0	0	1 Pharmacy
6	Bua	3	2	0	0	1	12	4	0	0	0
7	Nsenjere	4	1	0	0	2	12	5	0	0	1 Pharmacy
8	Liwladzi	3	0	0	0	3	10	4	0	0	0
9	DCGL	1	1	0	0	2	6	3	0	0	0
10	Matiki	18	4	0	2	6	5	8	0	1	1 Pharmacy
11	Nkhunga	9	2	1	0	2	12	5	0	0	1 Pharmacy
12	Kaongozi	1	1	0	0	1	6	2	0	0	0
13	St Annes	36	5	0	1	4	9	8	0	0	2 Home craft workers
14	Kapiri	2	1	0	0	2	16	4	0	0	0

No.	facility	Nurses	Clinical staff	Environmental staff	Administration	Ground labours	HSAs	Hospital/patient attendants	Incinerator operator	Mortuary attendant	Others
15	District Hospital	97	40	4	1	12	59	64	1	4	3 HPO 1 Nutrition 2 Auxlially nurse 6 Home craft workers

Source: DEHO, Nkhotakota DHO

According to DEHO, Some of the health related issues that may rise from the proposed road rehabilitation project, especially during the construction phase, include increased cases of ARI and TB due to noise pollution; increased injuries and accident cases by construction works; increased cases of malnutrition due to loss of crops and farm land to road diversions; increased cases of malaria as a result of water ponding created by construction activities and; increased cases of diarrhea resulting from poor human waste management at campsite and construction sites. All these anticipated health issues may result in increased OPD case load on health facilities that are already experiencing pressure due to low staffing levels.

5.4.8. Employment and labour markets

During the last population and housing census, the district registers a labour force of 129,456 with 70,393 unemployed (NSO,2018); representing a 54% unemployment rate.

The sugar industry provides most of the formal employment opportunities through district based companies such as Dwangwa Sugar Company, Dwangwa Cane Growers Limited, Unitrans, Ethanol, Cane Hauliers Limited and KK Security. Other job placements are found in government institutions, statutory entities, non-governmental organizations and private establishments.

The district has untapped employment potential in the tourism industry due to the presents of several tourism attractions such as Lake Malawi, Chia Lagoon, Nkhotakota and Dwambazi wildlife reserves, and a number of hot springs. According to the district's socio-economic profile, the main challenge constraining the tourism industry is poor road access to the district which gets worse in the rainy season due to frequent washing away of bridges and culverts. Other challenges associated with the labour market include gender inequality and child labour.

Information from SEP reveals that the district has District Child Labour Committee (DCLC), Community Child Labour Monitors (CCLM), Community Policing Forums (CPF), and Child Protection Workers that are working towards the eradiction of child labour in the district.

5.4.9. Sources and distribution of Income

The main source of income for the district is agriculture (crop and livestock), taking up 73% of all the district's sources of income. Other sources of income include formal employment (already discussed above), business, fisheries and forest resources.

5.4.9.1. Business

Those doing small and medium scale businesses (SMEs) dominate in numbers. Table 39 represents businesses operating in designated trading centres subjected to revenue collection by the district councils; grocery shop operators take the bigger share, over 38%.

From the community FGDs, participants perceived most of the listed businesses as being dominated by men. Women mostly dominate in mobile trading of items like fruits, already prepared food stuffs, and also businesses operated from homesteads. From Table 39 Nkhotakota Boma holds most of the recorded SMEs at about 56% followed by Mkaika trading centre at 20%. Surprisingly, Dwangwa records lowest number of SMEs among the district's major trading centres, despite being an urban area; this can be attributed in part to the presence of considerable number of large business operators like Chipiku stores and, the concentration of companies in the sugar industry resulting in significant numbers of the local population depending on employment rather than SMEs as a source of income.

Table 39: Distribution of types of businesses in the district

Business type	Number of traders	Percentage
Hawkers,Grocery/shops	322	38.3%
Welding shops	15	1.8%
Restaurants	38	4.5%
Hardware shops	47	5.6%
Tea rooms	12	1.4%
Barbershops	61	7.3%
Butchery	20	2.4%
Tailors	31	3.7%
Photo studio	7	0.8%
Saloon	54	6.4%
Cell phone repair	70	8.3%
Video show	13	1.5%
Bottle stores/bars	50	5.9%
Filling station	4	0.5%
Maize mills	60	7.1%
Lodges/rest houses	37	4.4%

Source: Nkhotakota SEP, 2017-2022

Table 40. Number of businesses by Area.

Trading Centre	TA/STA	No. of businesses	Percentage	Size of businesses
Boma	Malengachanzi	426	55.5%	Medium, Small Enterprise (MSE)
Mkaika	Mwadzama	153	19.9%	MSE
Mwansambo RGC	Mwansambo	38	4.9%	MSE
Lozi	Mphonde	26	3.4%	MSE
Dwangwa	Kanyenda	23	3.0%	MSE
Dwambazi	Kafuzira	33	4.3%	MSE
Matiki	Kanyenda	37	4.8%	MSE
Liwaladzi	Kanyenda	32	4.2%	MSE

Source: NkhotaKota SEP, 2017-2022

5.4.9.2. Fisheries Resources

The fisheries industry also offers another source of income to the district population through various avenues including fishing, fish farming, fish trading and production of fishing gears. The major fishing grounds in the district include Lake Malawi, Chia lagoon, Bua river and Dwangwa river; fish farming is done in ponds located in dambo areas, with Linga EPA having the largest concentration. Others only buy and sale fish without being involved in fishing or fish production. Men mostly dominated in fishing and in production of fishing gear, but there is a significant representation of women and youth in fish farming.

5.4.9.3. Forest Resources

Another area that provide sources of income to the district population is forestry. Firewood and charcoal provides 90% of biomass energy for cooking in the district (SEP 2017) resulting in forest degradation, loss of biodiversity, atmospheric pollution, and general environmental degradation. Other non-timber forest resources include traditional medicine, indigenous fruits, mushrooms, honey, bamboos, palms, reeds, grass, game and edible insects. People mostly rely on the timber products as opposed to non-timber

products due to lack of processing skills, packaging materials and start-up capital; promotion of enterprises that use most of the non-timber products, game excluded, would go a long way in promoting sustainable use of forest resources in the district.

5.4.10. Historical sites

The district has several historical sites managed under the department of antiquities, namely, Livingstone tree where Jumbe and Livingstone made a treaty in 1861 and Mkungu trees where Dr. Kamuzu Banda had his first convention in 1960. Both of these historic sites are located at Nkhotakota Boma.



Figure 42 Department of Antiquities

5.4.10. 1 Livingstonia tree

Dr. David Livingstone, a Scottish Missionary and explorer, visited Nkhotakota in 1861 where he witnessed slave trade at its peak. He got horrified in the way slaves were handled at Jumbe's stockade and he described it as "a place of bloodshed and lawlessness". David Livingstone visited Nkhotakota again in 1864 and met Jumbe; He was able to secure a

treaty between Jumbe and Chewa Chiefs under a tree to stop slave trade and hostilities between them. Unfortunately, the treaty did not last.

The remaining relics along this slave route in the district include;

- The first mosque built in the country,
- The graves of the three first Jumbes as well as their lieutenants' graves.
- The Fig trees where Jumbe and David Livingstone met and agreed to stop slave trade
- The site where the slave market stood,
- The village of descendants of slave traders and slaves who were freed by the British,
- The Anglican Church which was built on the village of freed slaves to offer them education and Christianity.

5.4.10.2. Kamuzu's Nkhungu Trees

The District has also history pertaining to the country politics as the first president, Dr. Hastings Kamuzu Banda held the first Malawi Congress Party (MCP) convention in 1960 under Nkhungu trees close to the Livingstonia tree.

5.4.11. Cultural environment

Nkhatakota is largely dominated by the Chewa at 75% of the districts population; tongas occupy few communities close to Nkhata-bay to the north of the district. As such, Chewa culture influences mostly of the practices in the district including marriage, chieftainship and initiation ceremonies.

Table 41: Nkhotakota population distribution by Ethnic groups.

Total	Chewa	Tumbuka	Lomwe	Tonga	Yao	Sena
392,617	297,747	15,129	8,402	41,019	7,636	6,761
100.0%	75.8%	3.9%	2.1%	10.4%	1.9%	1.7%
Nkhonde	Ngoni	Lambya	Sukwa	Mang'anja	Nyanja	Other
1,631	9,126	707	212	1,574	1,808	865
0.4%	2.3%	0.2%	0.1%	0.4%	0.5%	0.2%

Source: Malawi Population and Housing Census 2018

Regarding marriage, most communities practice matrilineal marriage systems where the husband leaves his parents' home to live in the village of his wife. The children born in the family are considered the responsibility of the wife's brother who holds the power to make critical decisions regarding these children. Such marriage arrangement is called *chikamwini* and the husband is known as *Mkamwini*. In some cases, the Chewa culture allows for the husband to take the woman to his village after meeting given conditions; such an arrangement is called *chitengwa* and the woman is called *mtengwa*.

Being a predominantly matrilineal society, chieftain succession follows the blood line of a woman; this implies that only children of the chief's sister can be considered to succeed a departed chief. Children born to women outside the chieftain blood line do not qualify to take up the chieftaincy.

Initiation ceremonies as a rite of passage play a very important role in marking somebody's passage from one stage of life to another. One such ceremony among the rural communities in the district is the one marking passage from childhood to puberty. Such a ceremony is aimed at instilling and maintaining cultural values. In some cases, the ceremony affects children's education in cases where they take place when schools are in session; some of the teachings are sometimes considered to promote promiscuity among the initiates resulting in increased school dropouts, early pregnancies and HIV infections.

5.4.12. Water and Sanitation

5.4.12.1. Water Supply

Largely, communities in the project area rely on boreholes as main source of portable water. Nkhotakota Town receives piped water from CRWB reaching about 85% of the population falling within the town planning area (Nkhotakota CRWB, 2023). The only gravity fed water scheme falling in project area is at Kapiri primarily designed for Kapiri health centre but was extended to supply surrounding communities through water kiosks.

Main water supply challenges reflect an issue of a fast growing population with very limited change in water supply facilities primarily designed for a smaller population. From all focus groups conducted with VDC leaders in project area across all the five affected TAs, the issue

of congestion at water points was mentioned, with other communities having water points spatially located causing some communities to travel long distances to access portable water. FGD participant in TA Mwadzama reported cases of people resorting to drinking from shallow wells and rivers due to limited number of boreholes in the area.

The CRWB office said the water supply system capacity does not much the demand forcing the office to resort to water supply rationing to be able to reach all connected clients.

The coming of the project may worsen the water situation in the project area especially during construction phase. A number of boreholes along the road distance fall within or just outside the road reserve, threatening displacement of the same, physically all otherwise. The CRWB has water supply infrastructures crossing the road and some running along the road in the road reserve; these also may be displaced thus disrupting water supply to some communities and critical institutions like St. Annie's Hospital and Nkhotakota Prison (Nkhotakota CRWB, 2023)

The RAP will include resettlement measures that will ensure total replacement of water resources that may not be avoided during road construction phase before works commerce.

5.4.12.2. Sanitation

Preveously, the district did not have established sanitary or waste management facilities in apart from the ones at the District Hospital and ILLOVO in Dwangwa. Now the district has two designated sites for waste disposal namely Mbewe and Dwangwa Landfills; plans are underway to construct the neccessaly facilities for the two to qualify as dumpsites. In addition, both Nkhotakota and Dwangwa markets have bins for market waste disposal.

Most household in the project area use pit latrines and have rubbish pits for disposing liquid and solid waste respectively. The district was declared Open Defecation Free by the National ODF Task Force and the latrine coverage for the district was record at 97% and sharing is at 3% by 2013 (EDO). The district could not provide latest statistics to help establish the current status.

Major sanitation challenges include lack of sanitation facilities in most trading centres in the project area in form of functioning toilets, rubbish pits or market bins and portable water. Despite having a market bin, Nkhotakota market faces a challenge of emptying it and is now overflowing. At household level, some communities in TA Mwadzama experience water logging conditions during rainy season which result in falling of pit latrines, as such, other households do not have pit latrines (community FGD).

The M5 road rehabilitation and construction processes will generate considerable waste in form of rubble, chemical discharges, oil spills and not forgetting human waste. The ESMP dictates for the contractor to have a proper waste management plan to prevent different forms of pollution that may result. In addition, the plan dictates proper treatment of excavated areas to avoid creating unwanted ponding conditions that become unsanitary spots within the communities.

5.4.13. Security Issues.

The Benga-Dwangwa M5 road stretch falls under Nkhotakota and Dwangwa police stations, Bua Bridge is the boundary for the police stations. Public policing facilities in the project area include Dwangwa Police Station, Mpondagaga police unit, Kaombe Roadblock, Mkaika police unit, Mkaika Police Mobile Service reserve camp, and Benga Police Unit.

Community structures working with the public police include community policing forum at T/A and GVH levels and Community Victim Support Units (CVSU) at T/A level.

According to Nkhotakota police officer in charge, the common crimes associated with project area are general theft of crops and personal items like phones mainly due to unemployment, poverty and food insecurity issues. Civil cases usually involve land related conflicts among family members and handled by chiefs; police are involved when the conflicts result in violence or threat of violence.

Other civil cases are domestic in nature which are handled by CVSU mostly involving women reporting men for not providing child support, husbands abandoning wives and

also causing bodily harm. Men don't usually report when they fall victims of gender based violence or abuse

Anticipated issues that may come with the project may involve disruption of construction works by individuals or communities dissatisfied with the compensation issues; the project will address all resettlement related complaints in line with the RAP before moving to construction phase.

Theft of construction sign posts may also arise during construction phase; the project, through the contractor will ensure proper coordination with Nkhotakota and Dwangwa police stations. In addition, the client will conduct community awareness on the role of communities in protecting and caring for public infrastructures, this will be done through existing district and community level structures.

5.5. Gender Assessment

The study used a participatory approach to understand the gender dynamics in the project area with focus on division of labour, access to and control over resources, income sources, literacy, and representation in community structures. Focus group discussions (FGDs) were conducted in two different communities, Benga and Mkaika; in each of the communities' men and women FGDs were conducted separately.

5.5.1. Findings and Discussion

5.5.1.1. Division of labour

The discussion looked at men and women in a household setting to determine who participates in which activities and who dominates. Activities were categorized into household chores (cleaning, washing, mopping, food preparation), fetching water and fetching firewood, which fall under reproductive roles; and crop cultivation and maintenance, and harvesting and post-harvest handling, which are productive roles. The color coded *Table 39* shows men's and women's respective perceptions of men's and women's level of participation in each of the mentioned activity categories.

Both men groups and women groups agreed that women dominate in household chores, fetching of water and harvesting and post-harvest handling. All groups also agreed that men participate in household chores, crop cultivation and maintenance, and harvesting and post-harvest handling.

Women groups were split on men's participation in fetching of water; one group said that men do not take part in this activity while the other group agreed that men sometimes help to fetch water for household use. Despite agreeing that both men and women participate in fetching firewood, women were split on the issue of dominance, one group agreeing that men dominate while another saying women dominate on this activity. Men also split on the issue of men's participation in fetching firewood with one group agreeing that men dominate while another saying men and women participate equally on this activity.

Men and women groups had a completely different perception on women's dominance in crop cultivation and maintenance activities; despite agreeing that both men and women participate, contrary to men's perception, women groups agreed that women dominate in participation as regards crop cultivation and maintenance.

Mostly men were said to participate in the two categories of reproductive roles in cases where all capable female household members were temporarily unavailable or incapacitated due to sickness or other reasons. It was also stated that in most cases, men and women equally participate in crop harvesting but women do most of the post-harvest handling like shelling, drying, packaging and milling. Through the discussions, it was also established that due to extensive deforestation, firewood was no longer found in abundance; people in the communities buy most of the firewood for household use thus shifting the role that was traditionally handled by women to be handled by men.

Comparing differences in perception across gender and location in relation to division of labour, what stands out from *Table 42* is the difference in perception between men and women rather than the difference between two communities. Men groups considered the division of labour between men and women equal regarding crop production activities; to

the contrary women said they carry most of the burden in this category of activities as compared to men.

Over all, all groups agreed, in spite of gender and location differences, that women in the area carry most of the burden when it comes to division of labour at household level, be it reproductive or productive.

**Table - 42: Perception of division of labour between men and women
disaggregated by gender and location**

	Household chores		Fetching water		Fetching firewood		Cultivation maintenance		Harvesting/post-harvest	
	W	M	W	M	W	M	W	M	W	M
women				Part/ no pa	Part/ domi	Part/ domi				
men						Part/ domi				
Bengal				Part/ no pa		Part/ domi	Part/ domi			
Mkaik					Part/ domi	Part/ domi	Part/ domi			

Color code: **dominate;** **participate;** **don't participate;** **split**

5.5.1.2. Access to & Control over Resources

March defines access as opportunity to make use of a resource, while control as the power to decide how it is used or who has access to it (March et al, 1999). The focus group discussions focused on the following resources to analyse the differential access to and control over resources between men and women: land, forest and natural resources, livestock, crops and livestock income, credit, income from ganyu and formal employment, and fishing income.

5.5.1.2.1. Access to and control over land and forest resources

All the groups agreed that men have more access and control over land than women; but unlike other groups, women in Benga considered themselves having no control over land. From the discussions, women were able to exercise control over land in cases where the land was purchased as opposed to inheriting it from parents or relatives; Mkaika is a more developed area and has more people buying land than Benga area.

On forest resources like firewood, charcoal, timber and fruits, Benga groups view women as having more access than men, while in Mkaika men were said to have more access than women. Traditionally women have been viewed to lead in access forest resources mainly for household use; but with increased depletion of forest resources, more and more households have to buy firewood, building poles and other forest resources. The buying of these resources is slowly shifting the dominance in access from women to men, and Mkaika seems to be ahead of Benga area in this respect. Never the less, all groups agreed that men dominate when it comes to who decides where to fell a tree or to sell fruits from trees owned.

Table - 43: Access to and control over land and forest resources

	access to land		control over land		access to forest resources		control over forest resources	
	women	men	women	men	women	men	women	men
women			No control		Dom/use	Don't use/ dom	No control	
men					Dom/use	Use/dom		
Benga			No control			Don't use/ u	No control	
Mkaika								

Color code: dominate; use/control; don't use/no control; split

5.5.1.2.2. Access to and control over livestock.

In the discussions livestock were divided into three groups based on their economic value. Both groups, the men's and the women's, in Benga perceived women more dominant in accessing poultry than men. Groups in Mkaika agreed on the issue of control over small ruminant (sheep and goats), perceiving men as having more control than women. But overall, the groups across gender and location split on who dominates on access to and control over poultry and small ruminant. From the discussions it revealed that traditionally men had more control over livestock, regardless of economic value; but currently there have been NGO intervention of livestock pass-on targeting women in groups, leaving men with less and less power to decide on livestock matters. The groups also split on access to and control over cattle and/or pigs though overall dominance on boss access and control pointed at men. The discussion with Mkaika men revealed that among the few who have cattle in the area, women outnumber men; and in addition women were more into livestock business than men as a result of NGO interventions that focus on women empowerment.

Table - 44: access to and control over livestock

	access to poultry		control over poultry		access to small ruminant		control over small ruminants	
	women	men	women	men	women	men	women	men
women	Domi/ use	Don't use/ domi	No control/ domi	Domi/ control	Domi/ use	Don't use/ domi	No control/ domi	
men			Domi/ control	Cont/ domi	Use/ domi	Domi/ use		Cont/ domi
Benga			No control/ domi	Domi/ control	Domi/ use	Don't use/ domi	No control/ domi	Domi/ control
Mkaika	Use/ domi	Domi/ use		Cont/ domi	Use/ domi	Domi/ use		
	access to cattle/ pigs		control over cattle/ pigs					

	women	men	women	men
women	Don't use		No control	
men	Use/ don't	Domi/ use		Cont/ domi
Benga	Don't use		No control	Domi/ control
Mkaika	Use/ don't	Domi/ use		

Color code: **dominate**; **use/control**; **don't use/no control**; **split**

5.5.1.2.3. Access and control over microfinance/VSL

The discussion on this was focused on participation in village loan and savings groups and /or access to microfinance facilities as access; and control was views as the power to decide how money from the VSL or other formal credit facilities was used. All groups across gender and location agreed that women dominated in both access and control of such resources. The prevailing trend is that the person who gets the loan is responsible for its repayment, as such, is equally responsible on how the loan is used and managed. The discussions revealed that very few men, if any, participate in VSL or are allowed to get loans from microfinance institutions operating in the area.

Table - 45: access & control over credit/VSL

	access to credit/ VSL		control over credit/ VSL	
	women	men	women	men
Women		Don't use/ u		No control
Men				
Benga		Don't use/ u		No control
Mkaika				

Color code: **dominate**; **use/control**; **don't use/no control**; **split**

5.5.1.2.4. Access to income from crops and livestock

This discussion point focused on income from crop and livestock production respectively, excluding income from buying and selling of crops and livestock products. There was a major split on men's dominance on access to crops income both across gender and location, with one group perceive men as dominant and the next group considering men and women having equal access to crops income. Regardless, all groups agreed that men have dominate when it comes to decisions regarding the use of crops income. Though the groups were split on the issue of access to and control over income from livestock, overall men were considered as more dominant than women on both access to and control over this resource.

Table - 46: access to and control over income from crops and livestock

	access to crops income		control over crops income		access to livestock income		control over livestock income	
	women	men	women	men	women	men	women	men
women		Domi/ use	No control		Don't use	Domi/ use	No control	Domi/ control
men		Use/domi						
Benga		Domi/use	No control		Don't use/use		No control	
Mkaika		Use/domi				Use/domi		Conti/dd

Color code: dominate; use/control; don't use/no control; split

5.5.1.2.5. Access to and control over income from casual labour (ganyu) and small businesses

Discussion on access to income from ganyu looked at participation and women's groups perceived themselves to dominate than men but were split on who dominated on control of such income. On the other hand, men considered themselves as dominating on both access and control of income from ganyu; Mkaika men claimed that men in the area preferred to delegate work on household crop fields to their wives while they go and work

in other people's field for pay. Overall, men were considered to dominate on control over income from ganyu.

Discussion on small business income focused on any small scale business excluding grocery shops. All groups perceived women to dominate both access and control of income from small businesses. From the discussions, more women were involved in small businesses like selling food items, fruits, grain and second hand clothes than men. Benga women explained that men had no say on money pertaining to wives' businesses even if they try; women get stricter with business money as much as they do with VSL money.

Table - 47: access & control over income from casual labour (ganyu) and small businesses

	access to ganyu income		control over ganyu income		access to small business income		control over small business income	
	women	men	women	men	women	men	women	men
women			Domi/cont	Cont/domi				
men								
Benga	Domi/use	Use/domi	Domi/cont	Cont/domi				
Mkaika	Domi/use	Use/domi						

Color code: **dominate**; **use/control**; **don't use/no control**; **split**

5.5.1.2.6. Access to income from employment and natural resources

On income from employment, the focus was on formal employment. All the groups agreed that among those earning income from formal employment, men dominated in numbers, just as they agreed that men have more control over how income from employment is used.

On natural resources, the focus was on income from firewood, wild fruits, sand mining, wild animals and other natural resources excluding fishing. All groups perceived men to dominate both access and control over income from natural resources.

Table - 48: access to & control over income from employment & natural resources

	access to employment income		control over employment income			access to natural resource income		control over natural resource income	
	women	men	women	men		women	men	women	men
women	Don't use		No control			Don't use		No control	
men									
Benga	Don't use		No control			Don't use		No control	
Mkaika									

Color code: **dominate**; **use/control**; **don't use/no control**; **split**

5.5.1.2.7. Access to and control over income from fishing

This discussion point looked at fishing income as income from fish as a natural resource in the lake, rivers and other naturally existing water bodies, as opposed to the buying and selling of fish, and the production and selling of fish. All groups perceived men to dominate in earning income from fishing and in decision making regarding such income. But data from the socio-economic profile show that even though men dominate in fish farming as well, their dominance is somewhat weaker than the perceived dominance in fishing as suggested from the focus group discussions (*see Table 49*); as of 2017, female farmers constituted 46% of the total number of farmers involved in fish production through ponds.

Table - 49: Access to & control over income from fishing

	access to fish income		control over fish income					
	women	men	women	men				

women	Don't use		No control					
men								
Benga	Don't use		No control/control					
Mkaika								

Color code: **dominate**; **use/control**; **don't use/no control**; **split**

Table - 50: Fish ponds and farmer participation by gender

EPA	Total of Ponds	No of Ponds (Active)	Ponds Own Clubs (Active)	Individual Farmers (Active)	No Youthful farmers	No of Farmers' by Gender		
						Male	Female	Total
Kasitu	61	31	22	9	6	145	156	301
Linga	96	72	17	55	40	126	99	225
Mphonde	47	37	27	10	20	189	91	280
Mtosa	52	36	21	15	10	130	95	225
Mwansambo	45	24	15	9	17	69	90	159
Nkhunga	86	61	27	34	26	170	134	304
Zidyana	33	19	17	2	43	72	100	172
Total	420	280	146	134	162	901	765	1666

Source: Nkhonkhotakota SEP, 2017-2022

5.5.2. Summary of the analysis on differential access to and control over resources between men and women

The bigger picture on access and control that was drawn from the analysis is that men are perceived to dominate on both access to resources and control over resources, with perceived dominance in control even over resources considered to be dominated by women as regards access. None the less, there are two gender positives, if not more, that can be deduced from the picture; one of men's weakened dominance or loss thereof on

some resources, and another of women gaining strong dominance of access and/or control over resources traditionally dominated by men.

Men seem to have less and less dominance on access to and control over livestock. The split on who makes decisions regarding the use of poultry is an indication that do not have overall dominance on the same; more groups perceived women to dominate on access to poultry. Though overall men were perceived to dominate on both access and control as regards small ruminants and cattle/pigs, the split in some groups may indicate that means dominance on use, ownership and decision making regarding these is weakening. As discussed earlier, this was attributed to NGOs' livestock pass-on initiatives that mainly focus on women.

More positive is the scenario where women were perceived by all groups to have strong dominance on both access and control regarding microfinancing and income from small businesses. Both cases can be attributed to presence of microfinancing institutions operating in the area who mainly target women for economic empowerment.

Table - 51: summary of perception on gender-based differential access to and control over resources

Resource	Women		Extent dominance	men		Extent dominance
	ACCESS	CONTROL		ACCESS	CONTROL	
Land						Strong on both
Forest						strong
Poultry			weak			
Small ruminants						weak
Cattle/pigs						Weak on both
Microfinance/VS			strong			
Crops income						strong
Livestock income						Weak on both
Casual labo (ganyu)						weak

Resource	Women		Extent dominance	men		Extent dominance
Income from small businesses			strong			
Employment income						Strong on both
Natural resource income						Strong on both
Fishing income						Strong on both

5.5.2.1. Sources of income by gender dominance

The gender assessment process also looked at sources of income available to the people in the selected area (Benga and Mkaika). The discussion process categorized the sources of income into formal employment, skill-based, other businesses and other income sources. *Table - 52* shows sources of income mentioned in each category and who dominates each source between men and women. The table also indicates whether the source was mentioned as used by many people in the area (major) or just a few (minor).

5.5.2.1.1. Formal employment

From the discussion very few women earn income through formal employment partly because the major labour markets are concentrated in the urban areas of the district, namely Nkhotakota Boma and Dwangwa; and that one major area of formal employment is in the sugarcane farms whose work is physically demanding, causing the employers to prefer men to women. In part, as will be discussed under literacy, more men than women are qualified for formal employments that require higher educational qualification.

5.5.2.1.2. Skill-based income sources

Most skill-based income sources are highly gendered being traditionally viewed as only for men or only for women. The discussions mentioned hairdressing, fishnet making, building, carpentry and welding as some of the skill-based sources of income; only hair dressing was dominated by women with no mention of men being involved, and few hairdressers earn

income from these sources. For men, among the many skill-based income sources mentioned, only fishnet making, building and carpentry were mentioned as major sources.

5.5.2.1.3. Other businesses

Though the discussions it was established that women dominate in small business like selling of fruits, buying and selling of grain such as rice and maize, and selling of already prepared food items either through door to door or having a restaurant. Men mainly dominates in grocery shop businesses and transportation, be it car, motorcycle or bicycle taxis. Both men and women equally use crop production and selling as a major source of income in the area.

5.5.2.1.4. Other income sources

On income sources that did not fall in the above categorize, women were perceived to massively dominate in the use of village servings and loan groups as a major source of income; very few men participate in VLS groups. This trend was mainly attributed to fact that most NGOs us VLS approach as a major tool for women's economic empowerment and as an implementation unit for many women focused interventions; as such, VLS groups have come to be regarded as a feminine undertaking not designed for men. Another source of income mentioned under this category include remittances for few women whose husbands are in urban areas within the district, in other districts, or outside the country especially in the Republic of South Africa. Begging was said to be another means use by a few, especially the ultra-poor.

Table - 52: Perceptions on gender-based differential use of sources of income

IGA category	Female dominated		Male dominated		Both men and wome	
	major	Minor	major	minor	major	minor
Formal employment			Sugarcane far workers;	H.S.A.s		Maize m attendant
				teaching		
				Security guards		

IGA category	Female dominated		Male dominated		Both men and women	
Skill-based		Hair dressing; salon;	fish net making	barbershop		
			Builders	welding		
			carpentry	tin smith;		
				tailoring		
Other businesses	selling fruits;	Selling vegetables	Shops/hawkers	Mobile money	Producing selling crop	Second hand clothes;
	Buying Selling grain (maize, rice)		Car/bicycle tax	Maize mills	Selling fish	
	selling cooked food		livestock	Butchery		
				pharmacy		
Other income sources	VSL	Remittance				begging

5.5.2.2. Literacy

On literacy, the assessment process focused on participants' perception of proportion of community members perceived to have attained a particular level of schooling and which gender dominates at that level. The schooling levels were categorized as those with basic numeracy skills especially when it comes to money, whether they ever attended school or not; those who attended primary school only; those who only reached secondary school; those who attended any formal vocational training; and lastly, those who have ever undergone tertiary academic or professional training.

5.5.2.3. Numerical Skills

The overall picture show that participants considered most people to have numeracy skills regardless of their education attainment or lack thereof; neither men nor women were considered to dominate on thus aspect.

5.5.2.4. Primary School level

Those who only attended primary school were also considered many with some groups splitting on whether dominate this category or not, though both groups in Benga perceived women to dominate; this indicates that women may slightly dominate in this category.

5.5.2.5. Secondary School level

For the secondary school category, all groups indicated that there were a considerable group of people in the community who reached this education level with men slightly dominating. This is aligned with district education statistics which put enrolment of boys and girls at 49% and 51% respectively, and dropout rate of boys and girls at 6.1% and 6.4% respectively. Mkaika women attributed the dominance of men at the secondary school category to the issue of girls dropping out to pregnancy or early marriage.

5.5.2.6. Tertiary – Vocational

All groups indicated that few people in the community attended formal vocational skills training and majority of such are men. This is because most people in the area considered such skills as only for men. But according to Benga women, the number of women going for vocation skills training is increasing due to support from NGOs that are working in this area to support young women.

5.5.2.7. Tertiary – academic/professional

Equally, all groups indicated that few people in the area attended institutions of higher learning and most of those who did are men. This also in part because of limited access to tertiary schools which are concentrated in urban areas.

Table - 53: Attainment of education by level and gender

	NUMERICAL SKILLS			PRIMARY			SECONDARY			TERTIARY VOCATIONAL			TERTIARY ACADEMIC/PROFESSIONAL		
	people in the area	W	M	people in the area	W	M	people in the area	W	M	people in the area	W	M	people in the area	W	M
women	Many/some	Incl/domi			Dom/incl				Incl/do						
men					Dom/incl										
Benga				Many/some					Incl/do						
Mkaika	Some/many	Dom/incl		Many/some		Dom/incl									

Color code: **dominate/many**; **included/some**; **not included/few**; **split**

5.5.2.3. Representation in community structures

On involvement in decision making processes, the genders assessment process focused assessing the differential representation of men and women in key community level decision making structures which are the area development committees at traditional authority level and the village development committees at group village level. For the community focus groups in Benga and Mkaika, perceptions of representation of men, women, boys, girls and of persons living with disabilities were sort; while for the ADC, actual figures of representation were sort from a leaders' FGD composed of representatives from all the six ADCs through which the targeted road section passes.

5.5.2.3.1. Representation in VDCs

Both Benga and Mkaika groups indicated that men, women and persons leaving with disabilities (PWD) were represented in their respective VDCs, with men dominating. Only Benga indicated their VDCs to having both male and female youths represented.

Table - 54: Perception on VDC representation by gender

VDC representation					
	<i>Women</i>	<i>men</i>	<i>female youth</i>	<i>male youth</i>	<i>PWD</i>
women			Rep/ no rep	Rep/ no rep	
Men			Rep/ no rep	Rep/ no rep	
Benga					
Mkaika					

Color code: **dominate;** **represented;** **not represented;** **split**

5.5.2.3.2. Representation in ADCs

On average each ADC has 16 women and 32 men, representing 30% and 60%, with 9%, 21% and 3% going to girls, boys and persons living with disabilities, respectively. Overall female representation falls a little shy of the 40% minimum female representation advocated for governance structures, with Mphonde ADC being a star performer at 43% female representation; Kanyenda ADC having the lowest female representation at 35%. A unique case is that of Nkhanga ADC which has a youth representation of 58%; this could be attributed in part to the fact that it is the latest ADC in the district making it more accessible to the youth in the area.

Table - 55: ADC representation by gender

AREA DEVELOPMENT COMMITTEE	Total	No. of Women	No. Men	No. of Youth		No. PWDs
				Females	males	
Malenga-chanzi ADC	60	24	30	0	1	1
Nkhanga ADC	45	8	8	10	16	1
Kalimanjira ADC	33	12	21	0	3	1
Kanyenda ADC	78	18	60	9	36	3
Mphonde ADC	63	19	44	8	8	1
Mwadzama ADC	40	13	27	3	4	2
AVERAGE	53	16	32	5	11	2
PERCENT	100%	30%	60%	9%	21%	3%

Source: ADC reps focus group discussion

5.5.3. Conclusion of the Gender Assessment

The five areas of focus (activity profile, access and control assessment, income sources, literacy and representation in community structures) selected for the gender assessment process reflect on women's practical needs and their strategic interests. Assessment of practical needs point towards what needs to be done to improve women's lives but does not address gender division of labour, let alone challenge women's subordinate position in society. Assessment of strategic interests on the other hand focuses on gender division of labour, power and control.

From the analysis it is evident that women in the selected communities are responsible for most of the activities at household level, indicating gender inequality in the division of labour. None the less, the analysis has revealed a shift in the right direction where many are more and more being involved in activities traditionally considered to be roles of women. This can be reinforced through increased efforts to create gender awareness deliberately designed to target men more.

The analysis has also revealed that though men have overall dominance over access and control of resources, women are becoming more economically empowered thereby forcing a shift in traditional patterns regarding access to certain resources and control thereof. This can be enhanced through efforts that would seek to narrow the gap in vocational skills and professional qualifications that exists between men and women in the area.

A very positive and strategic find is that of female representation in the ADC, which is the highest decision-making structure at community level. Efforts to ensure meaningful participation of the women at this level would go a long way to way to facilitate processes that may help close the gender divide in both the division of labour and the disparity in power and control.

CHAPTER SIX: IMPACT IDENTIFICATION AND ANALYSIS

The rehabilitation of the Benga – Dwangwa Road is expected to have both positive and negative impacts at the designing, construction and decommissioning stage of the project. These impacts are going to be more during the construction and decommission of the road project than during the designing phase. This section of the report presents the identified potential impacts of the project and their social, economic and environmental impacts at each stage of the project.

6.1. Impact Identification, Prediction and Analysis Methods

This process helps to establish what would happen to the physical and social environment as a result of implementing the project. In section 1.8 of this ESIA report explains in detail methods used in order to identify the relevant impacts. The rehabilitation of the road is expected to cause environmental stresses of various magnitudes, importance, probability and duration which could be exerted at different phases of the project. This ESIA has predicted and analysed the impacts to determine the extent of change likely to be brought about by the project using a number of characteristics including the following:

- ✓ **Magnitude / extent:** the measure in general degree, extensiveness or scale of impact.
- ✓ **Nature of Impacts:** Whether positive, negative, direct or indirect, cumulative, etc.
- ✓ **Duration:** the period of time over which an impact may occur and remain on site, from once-off to total life.
- ✓ **Likelihood:** probability or certainty of an impact occurring before mitigation is applied.
- ✓ **Timing:** The stage at which the impact occurs, whether during construction, operation or decommissioning or whether immediate or delayed.
- ✓ **Significance:** a measure of the importance of a particular action on the environmental factor in relation to its characteristics and based on specific standards, criterion or accepted policy. This helps the decision maker to focus on specific impacts likely to bring about adverse change to the environment and people and provide practical solutions.
- ✓ **Irreversibility:** An indication of whether an impact can be reduced reversed or stopped.

6.2. Impact Evaluation and Interpretation Criteria

After identifying the positive and negative environmental impacts of the proposed project an analysis to determine the extent and significance of impacts was carried out in line with the phases of the road which include designing, construction, decommissioning and operation phase. The aspects considered in the analysis included magnitude; significance; probability of occurrence; and duration of impacts.

- ✓ **Magnitude:** a measure of the general degree, extensiveness, or scale of impact, was scored at three levels i.e. household level, local level and regional level.
- ✓ **Significance:** a measure of the importance of a particular action on the environmental factor in the specific instance under consideration was scored using values ranging from +3 to -3. A score of 1 represents low/ minimal impact, 2 moderate impact and 3 representing a high impact. Negative impacts were assigned a minus sign and positive impacts are given a plus sign.
- ✓ **Probability of occurrence:** provides an estimate of the probability of an impact occurring before mitigation is applied. The impacts were rated according to the following scale:
Possible – impact may occur but it is not likely; *probable* – the impact is very likely to occur; and *Definite* – impact is unavoidable.
- ✓ **Duration:** refers to the period of time over which an impact may occur, from once-off to continuous for the life of the project. Duration of impacts was considered in terms of the following criteria:
 - Short Term (less than 5 years);
 - Medium Term (between 5 and 10 years); and
 - Long term (over 10 years).

6.3. Possible environmental and social impacts of the project

The possible environmental and social impacts which will result from the proposed project have been identified for the design, construction, decommissioning and operation phases of the project.

6.3.1. Design Phase

6.3.1.1. Positive Impacts

i. Creation of Employment opportunities

During the planning phase, the developer will employ people to undertake feasibility studies, develop detailed project designs and carry out an environmental and social assessment of the proposed project. The impact is short term as it will last for a couple of months during the planning and construction phases. Hence the impact is of low significance.

As an enhancement measure: the developer shall Maximise employment of professionals registered with relevant Malawian institutions and authorities; Give equal employment opportunities for both men and women; and ensure that relevant taxes have been remitted to the Malawi Revenue Authority (MRA).

6.3.1.2. Negative Impacts

i. Anxiety of loss of land and property.

As the news of the proposed project gets to the local people there will be issues of fear of losing land and property for those close to the road. This is mostly the case due to clear and true information about the proposed project and how it will affect people with land and property close to the road. This can bring about wrong actions and decisions from the local population, not mentioning the loss of a peace of mind.

Enhancement Measures: The developer will conduct public awareness on the project and will hold consultation meetings with different stakeholders including project affected persons to seek their views on how best to compensate and resettle the affected persons where necessary.

ii. Anxiety of temporary loss of businesses

Just as it is with the first point, there will also be fears of temporary loss of businesses, as some businesses will have to relocate from their initial place of business, and also the new place might not be as advantageous for business as the initial.

Enhancement Measures: The developer together with the local leaders will sensitize the community members about the project and will look for an alternative place for operating different businesses. Where necessary the owners of different businesses will be compensated accordingly for temporary loss of businesses.

iii. **Loss of property due to widening and realignment of road carriageway.**

The proposed project will surely bring about involuntary resettlement impacts due to widening and realignment of the carriageway and also due to considerations of road safety, as not to have houses or structures too close to the road.

Enhancement Measures: All involuntary resettlement impacts (i.e. loss of land, homes, structures, crops, trees) shall be addressed through preparation of a Resettlement Action Plan (RAP) which will include therein issues of compensation;

- ✓ Implementation of the RAP;
- ✓ Create a Grievance Redress Mechanism with multiple channels.

6.3.2. Construction Phase

6.3.2.1. Positive Impacts

i. **Increased trading activities**

The rehabilitation of the road shall have a significant positive economic impact of the area and the district as well as the country in general since accessibility and motorization of traffic will be improved. The improved accessibility of the road will enhance business activities along the road, in all the trading centres. Road side vending is going to increase and more people are going to construct various business houses such as eco-tourist lodges, bars and other Agro processing activities. The increased flow of traffic will promote the growth and development of agro-based industries in the district.

Increased business activities will lead to improved employment opportunities along the road and the district. Increased business activities along the road and in the various trading centres along the road will provide better trading and employment opportunities for local people in the area. All the trading centres along the road which will lead to the emergence of small, medium and large-scale enterprises.

Enhancement Measures: It is important for the the PIU/RA to carry out community sensitization on business opportunities that will come about due to the project implementation. The coming of the project will bring about an influx of people to the communities along the road, hence these people who are mostly workers for the project are potential customers and even business partners. The Council should also conduct safety awareness regarding construction activities and how the people can conduct their businesses in a safe manner. The project proponent should consider carrying out feasible initiatives that will aim at building entrepreneurial capacities of the communities along the road so as to maximise this opportunity and also to be able to sustain and grow their businesses.

The increased economic activities will bring with it other social and economic challenges such as prostitution, theft, road accidents, diseases such as COVID 19, HIV and AIDS and others. It is therefore very important for the District Council to strategically position itself in order to prepare for these expected challenges and impacts that may arise due to the rehabilitation of the road.

ii. Creation of Employment opportunities

The road construction project is expected to recruit about 3000 people mostly from the local area. This will further boost the economic activities of the area since many people are going to have a sustained source of income for the improvement of their households. The people employed in this project will require goods and services from within the area creating a cycle of economic activities and growth. Increased job opportunities means increased buying power by the local people leading to more revenue in terms of taxes for the government.

The proposed project is expected to use human labour in some of the operations and this is expected to result in the employment of people in all categories of skilled, semi-skilled and unskilled labour. It is estimated that about three thousand (3000) jobs will be created. Currently, job opportunities are generally scarce in the country and the project area is of no exception. The proposed project will benefit the local economy as contractor employees will have disposable income which they can spend on various goods and

services. Local businesses will benefit from the presence of the contractor workers and delivery truck drivers in the project area. These include tuck shops, food vendors (including farmers selling their produce), bars, general dealers, supermarkets, public transport providers etc. In addition, the contractor might rent some houses or properties for employees in the project area.

Enhancement measures: It is imperative therefore that the project develop a robust physical development plan to sustain the job opportunities that will be created by the implementation of the project. Further, the proponent will have to consider employing local unskilled labour force too while paying particular attention to gender consideration of at least 40% minimum. This has a significant effect on the national economy considering that unemployment is one of the major social challenges facing the country contributing to high levels of poverty. Not only that but also enforcing the Malawi labour laws and Wages must be above the minimum wage and overtime must be paid on time.

To ensure recruitment of local people, it is paramount that the contractor should engage the District Labour office in collaboration with Ministry of Labour during mobilization. The contractor should seek guidance from the District Labour office on hiring procedures and ensure compliance concerning the same. The contractor should ensure that the ADCs and VDCs are part of the processes and engagements since they are grass root level local institutions of the District Council.

iii. Knowledge and Skills Transfer

Employment of local people from within the projects area of impact will facilitate capacity enhancement and the acquisition of specific skill sets through on the job and formal training. The skills will include; brick laying, surveying, civil works, and etc. These skills are important to the beneficiaries beyond the life of the project thereby contributing to manpower development at the local level. These skill sets may then be readily replicated after employment termination in other construction related projects.

Enhancement measures: It is recommended that the proponent should make a deliberate effort to employ Malawians and mainly the local people from within Nkhotakota in particular the project surrounding communities. The contractor should have a window for apprenticeship opportunities for students from the public and private universities to build capacities in engineering, human resource development and environmental fields. Make

deliberate effort to pair skilled and unskilled workers during various construction assignments; and Formalise on-the-job trainings for local unskilled labour that also includes learning targets and performance monitoring.

iv. Payment of Taxes

The Public Procurement and Asset Disposal Authority (PPDA) guidelines to procurement as well as the Malawi Revenue Authority (MRA) guidelines state that all procurements have to be taxed except if there is a waiver of tax exemption. The Contractor fee in this case will be taxed, all goods and services made by the contractor will have a Value added tax and lastly the workers will pay Pay As You Earn (PAYE) to Malawi Revenue Authority (MRA), thereby increasing the revenue base for the government of Malawi. Further to that, the contractor will be obliged to pay fees for example, extraction of gravel and sand, water etc., to District Council and the government of Malawi at large. This impact is applicable at all the project stages.

Enhancement measures: The contractor will have to ensure fairly, honestly and timely remittance of the taxes to Government and procure services and goods from tax compliant businesses.

v. Increased disposable income/ Improved Standards of Living

The workforce at the project site will earn significant incomes which will result in an increased disposable income.

Enhancement measures: The consultants and contractors should endeavour to pay their workers above minimum wage set by Government at all project stages. This will help improve the standard of living for the workers and other local communities indirectly earning income from the related service activities.

vi. Increased trade and marketing

The construction phase of the project will be executed by a building contractor registered by the National Construction Industry Council (NCIC). The project will also be buying construction materials from the local market and will provide business for the local

businesses. Apart from the construction related materials and services, the people in the project area of impact will be selling food items to construction workers, which will improve their incomes. Despite this positive impact, the impact is going to be short-term as the construction phase will take a short period of time.

Enhancement measures: Pay building material supplies within the agreed time; Source materials from approved licenced suppliers; Support and promote entrepreneurship skills amongst communities and business people; provide safe business shelters for local businesses trading around the area; Pay all associated taxes to the Malawi Revenue Authority; and Buy materials manufactured in Malawi. Therefore, rehabilitation of road project will increase trade and marketing within the area and Malawi as whole.

6.3.2.2. Negative Impacts

i. Clearance of vegetation and loss of Biodiversity

The rehabilitation of Benga – Dwangwa (M005) Road to a 7 meters carriageway and 2 metres width sealed shoulders, double lane bridges and works at borrow and quarry sites including access roads to such sites will result in clearance of some woody and shrub vegetation species. There will also be a loss of grass and herbaceous cover biomass in addition to the woody and shrub species. The clearance of vegetation poses a threat to key plant species that contributes to local diversity. One of the environmental challenges in the project area is deforestation and as such any form of vegetation clearance is undesirable though inevitable. The plant species to be cleared have some biodiversity, economic, cultural and traditional (medicinal) and/or amenity value. It is also important to recognize that there is a risk of unintentional introduction of alien species to the area, and given the unpredictability of the impacts on biodiversity of alien species, this should be considered as an environmental challenge for the project. The National Forest Policy of Malawi sees forest resources as a means of alleviating poverty and loss of such forest resources ought to be compensated and replaced.

Mitigation measures:

- Only the trees that interfere with construction servitude should be removed. This will avoid unnecessary exposure of bare soil and will maintain vegetative screen.

- Deposit stripped vegetation at suitable sites nearby for use as fuel wood by local residents.
- Fire should strictly be prohibited from usage during clearing of the vegetation.
- In the design, careful consideration should be given to avoiding large trees and highly vegetated areas, if feasible.
- In all earthworks operations, ensure topsoil is stripped and stockpiled separately from subsoil and is reused for rehabilitation works. This will allow quicker re-vegetation of the affected areas.
- The contractor should use the existing tracks to borrow pits and quarry sites to avoid destruction of unintended vegetation. The contractor trucks should stick to the designated access routes and avoid other undesignated routes as these will have an effect on vegetation including grass and herbaceous cover.
- All opened borrow pits and quarries must be rehabilitated once their use for the project has come to an end. If the contractor chooses to use the existing borrow pits and quarries which are currently un-rehabilitated, the contractor should rehabilitate such after completion of works.
- For the purpose of revegetation of the project affected areas, the contractor should develop and implement an adequate Biodiversity/Habitat Restoration plan. This is to be developed prior to commencement of clearing and grubbing for it shall include the procedure to ensure the removal of vegetation is only in areas demarcated for project works and the recording of each tree and its area of removal. The restoration plan shall clearly stipulate the native tree species (or species recommended by the District Forestry Office) to be planted, this is to ensure maintenance and restoration of biodiversity and habitats of the area.
- The contractor should make sure that before construction vehicles and plants arrive on site are clean and free of soils and plant material. Any vehicles that arrives on site and need to be cleaned will be directed to the wash station established at the camp site.
- The contractor to operate following a method statement especially for environmental sensitivities.

ii. **Impacts of land acquisition for the quarry sites, borrow pits, asphalt plant, and campsites.**

The establishment and operation of borrow pits, quarries sites, asphalt plants, and campsites can bring about conflicts with local communities if sites are not properly acquired and managed, and if these sites hinder access to other local resources. The land acquisition process must adhere to all relevant laws and consider all possible environmental and social impacts seriously.

Mitigation Measures:

- The contractor shall conduct proper consultations with all relevant regulatory bodies, including environmental and mining bodies, and also engage community leaders before acquiring any land.
- The land or sites for the extraction of quarry and gravel, establishment of borrow pits, asphalt plants, and campsites should be acquired with proper permits or agreements in place.
- The sites are to be enclosed to prevent accidents due to unauthorized entry by children and other community members.
- If possible, the contractor should source quarry materials from already existing registered quarry miners

iii. **Interference with project area rivers and streams riparian buffer zones**

Riparian buffer zones create a transition area between water and land that allows for habitat corridors as well as the natural, meandering curves in a river or stream, slowing the speed of water and stabilizing stream banks. Riparian buffer zones serve the following purpose:

- a) **Erosion and Sediment Control:** The dense root systems of a riparian buffer zone hold soil on the stream bank and helps to trap sediment flowing downstream that would otherwise become a contaminant.
- b) **Water Quality:** Riparian zones also help to prevent water pollution. Vegetation in riparian zones function as filters - both to filter water flowing downstream and to filter the pollutants in stormwater runoff before it reaches streams and rivers.
- c) **Habitat:** The diversity and concentration of vegetation within riparian zones provides habitat for a variety of animals and insects.

- d) Flooding: Riparian zones help to absorb flood waters that would otherwise damage adjacent urban, forest or agriculture lands and contribute to stream bank erosion.

The many rivers and streams that pass across the Benga – Dwangwa (M005) Road section should be protected from adverse impacts from the project such as siltation, pollution, alteration of natural hydrology and loss of riparian buffer zone, including destruction of habitats. Considering that the Road has a lot of bridges the impacts on rivers and streams are very much expected. Possible impacts on the river and its riparian buffer zones can arise from erosion and sedimentation, clearance of vegetation, excessive water use, illicit waste disposal, residual chemical contamination from bridge construction and oil products used for the machinery and construction vehicles. These will affect fish and aquatic life and water users downstream.

Mitigation measures:

- The contractor should ensure that the natural drainage systems are not altered.
- All existing vegetation including trees, shrubs and undergrowth shall be allowed to remain undisturbed within the naturally vegetated buffer strip outside the work area.
- Create awareness amongst the community members and collaboration with water resources users' associations about riparian protection, to help in the monitoring and protection of the rivers and riparian buffer zone.
- Contractor should acquire a permit from the National Water Resources Authority (NWRA) for water abstraction of water; this should be obtained prior to use and conditions of the permission strictly observed.
- Drainage systems should not be oriented directly towards the river.
- The adjacent upland should be protected from high speed run-off.
- Construction of bridges and other major earthwork works around water sources should provide for soil erosion protection measures and scheduled during dry seasons to minimize the entry of soil material into the rivers by flooding and runoff water.

iv. Noise and vibration

Noise will be generated by the movement of construction vehicles to and from work sites and the operation of construction machinery, including earth moving and compacting

machinery, excavators, trucks, tippers, rollers, and concrete mixers. Additionally, drilling and other construction activities may contribute to noise levels. Excessive noise can lead to annoyance, sleep disturbances, and interfere with daily activities, posing a threat to public health. High noise levels from heavy machinery can also hinder communication and impair concentration. Vibration from excavation activities can cause damage to nearby properties, including residential houses, which may result in serious public relations issues

Mitigation measures:

- Regular and proper servicing of machinery and vehicles will reduce the impact of noise.
- Conducting work during daytime hours only, from 07:00 to 17:00, particularly for delivery trucks passing through built-up areas.
- Ensuring that any disruptive activities are minimized, with prior notification to nearby residents.
- Conducting joint inspections and photographing adjacent properties before and after construction activities, with agreement from property owners. Any damage incurred during the works will be reinstated to its original condition by the Contractor.

v. Improper Waste Management

The Project will generate solid and liquid wastes from different construction activities, such as the removal of old tar, clearing of access roads; removal of vegetation along the road, maintenance of Machinery and vehicles, use of construction materials as well as the material from domestic activities by the construction workers. Improper waste management will bring about adverse impact such as soil contamination, water pollution, air pollution, harm towards animal, marine life and people.

Table 56 below is a summary of different types of wastes expected to be generated at various stages of the road project and types of activities.

Table - 56 Summary of types of waste and their characteristics

Project Activity	Anticipated types of waste	General characteristics of waste
Construction and operation of the campsites	Domestic solid waste from campsites	Food remains, plastic papers, glass, cans, wood, rags, metals etc. construction materials, debris Trees and debris from clearing the camp sites
	Effluent from wash bays, bathrooms etc. Oil products and paints Gases and smoke	Washrooms containing soaps and detergents, Septic tank liquid waste and antiseptics, Oils from vehicles and other machinery, paints, insecticides, pesticides etc. Fumes from construction vehicles
Clearing of vegetation along the road	General solid waste and oil products Gases and smoke from moving vehicles	Tree branches and trunks, leaves, grass, top soil, sand rocks and pebbles Smoke and gases from moving vehicles Smoke from burning debris, cooking Tree branches, trunks, leaves, grass, soils, rocks, sand, pebbles Stock piles of materials
Cut and fill to remove top layer and construction or road related infrastructure	Excavation of gravel sub-layers and fill materials	Carbon dioxide, monoxides, sulphur, nitrogen compounds, particulate matter, etc. from operation of machinery and vehicles. Waste water
Excavation of gravel sub-layers and other fill materials	Gases, waste water	Operation of machinery and vehicles (Carbon dioxide, monoxides and other gases, particulate matter, runoff

Project Activity	Anticipated types of waste	General characteristics of waste
Application or drainage of excess water from the road	Runoff, oil spillage	Runoff can contain high levels oils, smoke etc.
Transportation of soil, quarry and other materials	Gases, oils, dust	Carbon dioxide, smokes, air contamination
Construction of road related infrastructures	Solid waste, gases, oils	Stone aggregates, oil leakages into streams, rivers and lake, CO ₂ , carbon monoxides, silt, stones, particulate matter, cement metal, timber, etc.
Application and compaction of base layer and sub base	Gases, oils, runoff, particulate matter	Carbon dioxide, monoxides, nitrates, cement, soil dust
Construction of road shoulders and drainage systems	Oil spillage, run off, gases	Carbon dioxides, monoxides, , cement, tax, concrete blocks pieces, bricks etc.
Landscaping and rehabilitation of degraded sites including borrow pits and detours	Gases, particulate matters, oil spills	Carbon dioxides, monoxides, smoke, soil dust etc.
Decommissioning and operation	Demolition wastes, general solid waste, waste water	Debris (sand, bricks, timber, metal, plastics, oils, lime, obsolete or damaged materials, explosives, runoff

Mitigation measures:

- Contractor should develop and implement an adequate waste management plan, and the measures should be developed to ensure Reuse, Recycle and reduce generated waste.

- The contractor to liaise with the Nkhotakota District Council on identification of a dumpsite.

vi. Impacts on soils

The rehabilitation of Benga – Dwangwa (M005) road will involve a number of activities that will have an impact on soils. These impacts on the soils will affect agriculture productive of the areas and long the road as well as affect water bodies. Some of the activities that may affect the soils along the road project include:

Clearing and excavation- this removes the top soil and vegetation making it prone to soil erosion during dry and wet seasons. The runoff from the road can cause siltation of streams and rivers affecting fish breeding ground considering that the streams and river along the road provide a very good ground for fish breeding. Clearing and excavation may cause accelerated or uncontrolled sedimentation in the water courses and road side drains as well as affect the growth of the various tree species which have medicinal values.

Storage and disposal of waste materials (asphalt, oils, fuel, oils, sand, cement act). Very often if these materials are spilled on the soil; contamination is strong and recovery is difficult. Careless storage and dumping of these types of waste may lead to permanent damage of the soil structure along the road project which in turn will affect the agriculture and livestock activities of the people of the area.

Movement of vehicles and other heavy construction machinery has a serious effect on soil structure and texture. Movement of heavy machinery can cause compaction of soil outside the road alignment.

Mitigation measures:

- Ensure that the Contractor are advised to limit clearing activities of the road to the areas within the road reserve.
- Erosion control structures for drainage systems that collect water and discharge to natural drainage lines should be constructed.
- Unwanted waste should be carefully disposed of in designated places only.
- The Contractors should ensure construction of erosion and sedimentation control mechanism such as diversion banks and filtration structures is undertaken.

- Where necessary, rehabilitation and planting of avenue trees and grass on all slopes and unstable areas is a must.
- The borrow pits, quarry sites, sand pits and others should be fully rehabilitated at the end of the project in order to mitigate the negative impacts of the same.

vii. Impacts on water quality

In many cases water is a vulnerable resource in road construction works. Rehabilitation of the road can lead to the contamination of the streams, rivers and the lake. These contaminations can have a serious environmental effect on the fauna and flora along the streams and rivers. These streams are high productive areas for the people in the areas since it is where they grow their crops such as rice, bananas, maize, cassava, fruits and graze their animals. These rivers are also fishing grounds as well as breeding ground for fish from Lake Malawi. A number of project activities can lead to water resource degradation and depletion including construction of bridges and culverts, general road earth works, construction and operation of campsites (sanitation and latrines), road paving operations, storage of materials (bitumen, oils, fuel, explosives, rock aggregates, sand, cement etc.), extraction of raw materials (sand, gravel etc.), transportation of materials and water pumping and use. Effluent and run off from the camp sites and storage areas can contain high levels of pollutants including human wastes, asphalt compounds, inorganic and organic pollutants, fuels, oils, lime, cement and other elements.

In addition, it is common with workers at work and camp sites to use the bush as toilets especially during the initial stages of project commencement, or in some worst instances for the entire duration of their stay. This not only has health implications for the workers themselves as they become susceptible to a number of water related diseases, but also poses risks of contaminating water resources. More so that the project road falls within the catchment area of Lake Malawi, Chia Lagoon, major rivers and a number of shallow boreholes.

These activities will negatively affect water quality parameters (faecal form, COD, BOD, total dissolved solids, total suspensions, etc.) because of pollution from chemical and human wastes. Other impacts include hydrological changes (alteration to local hydrology), siltation of water bodies including stream and rivers, depletion of water resources due to

over-use from single sources, flooding caused by poor location of infrastructure etc. All these often lead to disturbance to aquatic ecosystems leading to loss of Aquatic life. The Water Policy and Act gives powers to the Water Resources Board to regulate water use and requires project developers to apply for water use rights before actual use. Silt increases water turbidity, nutrient loading and TDS. Siltation is a major challenge in the project area with environmentally sensitive areas such as Chia Lagoon, Lake Malawi and major rivers affected by this.

Mitigation measures:

- Store materials and establish campsites outside drainage lines so as to minimize sedimentation and pollution ensuring that construction activities take place during the dry season when precipitation is at lowest levels.
- Plant vegetation in disturbed riparian zones
- Ensure that wastes are properly dumped in designated places. Since Nkhotakota District does not have a dumping site, there is need for the Contractor to discuss and agree with the District Council to designate some areas where waste can be dumped under the guidance of MEPA.
- Toilets should be provided at the work and camp sites. No pit latrines are allowed to be constructed at these sites as pit latrines are known to contaminate ground water quality. The contractor could use mobile chemical toilets or construct flush toilets connected to a septic tank (depending on the expected life of the camp site). The septic tank should not be allowed to overflow and spill, but should be emptied on a regular basis for disposal at an appropriate and designated off site facility capable of handling such waste.
- The contractor should install sufficient and appropriate waste bins with lids at work and camp sites to store the waste produced on a daily basis. Waste bins should not be allowed to overflow and should be emptied a minimum of once daily. The waste may be temporarily stored on site in a central waste area that is weather and scavenger proof. No burying and burning of waste will be permitted. All waste should ultimately be disposed of at an appropriate and designated off site facility capable of handling such waste.
- Vehicles, plant and machinery should be fuelled and serviced at workshops on concrete/hard surfaces so that any oil spillage is drained onto a catch-pit or container

for disposal at an appropriate and designated off site facility capable of handling such waste. No servicing of vehicles and machinery should be carried out at work sites.

- Ensure that fuel and oils storage areas are adequately bundled and that any spills and leakages are not released to the environment but retained in sealed containers for disposal at an appropriate and designated off site facility capable of handling such waste.
- Undertake routine (quarterly) water quality tests within the project area, review in comparison with baseline data.

viii. Impact on air quality

Road construction projects impact air quality through various pollution sources, including emissions from construction machinery and vehicles, as well as road paving activities involving asphalt compounds, which pose health risks to workers through skin absorption and inhalation. Transportation of materials and equipment generates dust and emissions, contributing to acute respiratory infections among locals. The fugitive dust generated during construction may contain particulate matter, posing health risks upon inhalation. Additionally, burning of waste introduces Green House Gases (GHGs) and toxic fumes into the air. Measures must be taken to mitigate these impacts and safeguard both worker and community health

Mitigation measures:

- It is necessary to provide dust mask and respirators to those people who operate or work near machines, or work in dust prone areas and asphalt preparation or application areas so that no human health problem will be of concern.
- Ensure that air pollution regulations as provided by the EMA 2017 and other Acts are fully enforced.
- Vehicle standards should be maintained i.e. vehicles should be fitted with catalytic converters to reduce air pollution.
- Dust impact should be minimized by occasional water sprinkling of access routes and work areas. The contractor should, based on the conditions (e.g. wind direction, weather conditions) decide how many times per day should sprinkling be carried out.

- During the dry season dust pollution should be prevented by traffic calming devices to reduce travel speeds of vehicles in these sections.
- Ensure that excavated materials being transported are well secured within vehicles and covered to minimise the risk of being blown by wind or spilling out due to overfilling and causing damage to other vehicles and air quality.
- Regular inspection of dust emitting areas and operations is necessary.
- Asphalt mixing areas should be well ventilated and all bare areas kept wet.
- Cover stockpiled material, which could be blown by the wind.

ix. **Displacement of properties, services, and loss of agricultural lands along the road reserve boundary:**

The Malawi Rural Travel and Transport Programme (MRTTP) identifies road reserve encroachment as a significant challenge, contributing to the displacement of properties and services along the M005 Road. The Public Roads Act stipulates specific road reserve widths, with a main road like the M005 requiring a 60-meter reserve, including the carriageway and shoulders. Despite these regulations, the current M005 Road is characterized by encroachments, particularly at settlements and farming areas, where structures are built within the road reserve boundaries. Encroachment not only poses safety hazards but also accelerates road deterioration by blocking drains essential for water drainage, a major factor in road degradation.

Furthermore, the cultivation and grazing of agricultural lands within and along the road reserve present additional challenges. Villagers along the Benga to Dwangwa stretch rely on these fertile and moist lands, covering approximately 240 hectares, for farming and grazing activities. The construction of the road is expected to significantly affect these villagers, as they will lose access to these areas where they cultivate crops such as maize, rice, bananas, and fruits *Figure 43*.



Figure 43 Rice grown in the drains of the road

Mitigation measures:

- A Resettlement Action Plan (RAP) is being prepared as part of this project and all affected properties will be documented and valued prior to compensation and or relocation
- In future, laws on road reserves should be strictly implemented
- Community education initiatives to raise awareness about the importance of road reserves and the consequences of encroachment.
- Promotion of small-scale agricultural activities within the road reserve, such as vegetable cultivation and floriculture, to provide alternatives to permanent land use and mitigate the need for costly compensation

x. Increased incidence of sexually transmitted illnesses (STIs) including HIV and AIDS

Construction works normally brings along concentration of people in campsites. It may also cause an influx of migrant workers looking for employment opportunities. An influx of migrant workers can be socially disruptive force on social structure. Sexually transmitted diseases (STDs) including HIV/AIDS and other social diseases often increases in areas where construction camps are located. This observation is shared by many stakeholders consulted in the project area. The encampment of workers coupled with income differentials

between local residents and workers on site might result in development of relationships which might result in the transmission of STDs including HIV/AIDS. Both school girls and young unemployed women are especially vulnerable, as they can easily be tempted with prospects of financial benefits from relationships.

Mitigation measures:

- The contractor should be encouraged to source unskilled labour from the project area and minimize the need to import labour from outside the project area.
- The contractor should comply with national and district health and safety initiatives, guidelines, programmes, policies and legislation
- A fully fledged HIV/AIDS programme should be implemented both for the contractor staff and the residents of the project area. Ideally this should comprise of education before the implementation of the project, followed by programmes during construction including distribution of condoms, voluntary testing and counselling and appropriate treatment.
- Pamphlets and other HIV/AIDS material should always be available and displayed in the site offices.
- Communities around the project area should be reached out to with HIV/AIDS prevention information through use of media (print and electronic) and other appropriate IEC materials (e.g. T-shirts, caps, flyers, newsletters etc).
- The community members especially females should be taught skills for negotiating for safer sex.
- Intensify STIs and HIV/AIDS awareness campaigns in the project area

xi. Impact on Community Health and Social Well-being

Unplanned or Teenage pregnancies may increase, especially among schoolgirls. Both schoolgirls and young unemployed women are particularly vulnerable, as they can easily be tempted with prospects of financial benefits from relationships. This can result in them dropping out of school and becoming a burden to their families and the nation at large.

Mitigation measures:

- The contractor / project should have a Grievance Redress Mechanism in place.

- The contractor employees must all sign a code of conduct
- Cases of abuse should be reported to the police for investigation and prosecution.
- Implement comprehensive sexual and reproductive health education programs in schools and community settings to raise awareness and promote responsible behavior.
- Strengthen access to reproductive health services, including family planning counseling and contraceptive services, to empower individuals to make informed choices about their reproductive health.
- Engage community leaders, religious institutions, and other stakeholders in promoting gender equality and addressing cultural norms and practices that contribute to early pregnancies.
- Foster economic empowerment opportunities for young women and girls to reduce their vulnerability to exploitation and dependence on potentially harmful relationships

xii. Disruption of traffic

Slow moving contractor delivery vehicles and machinery to and from the work sites will result in traffic disruption and possibly accidents. Motorists using the M005 Road will be forced to slow down or stop to give precedence to contractor vehicles and machinery. Some sections of the project road will be closed and motorists forced to use provided diversion routes. The longer the diversion the greater the delay. The delay will also be determined by the quality of the diversion roads.

Mitigation measures:

- Adequate signage is required to warn motorists of the presence of contractor vehicles and machinery on the road and of the road diversions.
- Contractor vehicles and machinery should use designated access routes to and from work sites to minimize disruption.
- A maximum speed limit of 50km/h should be applied to all contractor vehicles within the project area.
- It is desirable that traffic police be visible along the project road stretch to enforce the Road Traffic Act.
- Contractor should to develop and implement a traffic management plan.

xiii. Exposure Occupational health and safety

Most of the project activities pose a direct threat to the health and safety of project employees and the surrounding communities. Dangerous operations take place during road construction including handling of hazardous and flammable materials like hot asphalt and fuel, operating complicated machinery and various other civil works. During road construction personnel and the general public are exposed to various risks including accidents from operation of machines and vehicles, intense noise and lights, strong vibrations, toxic emissions and chemical substances, hot or corrosive substances, flying or falling objects, slippery places, rotating or fast moving objects, electric shock, explosives, fire, strong smells, irritants, sticky substances, sharp objects, rough surfaces, holes and pits, cross ropes and wires, tilted surfaces and many other dangerous situations. These can cause serious injuries and fatalities if not attended to. A lot of other factors can lead to accidents such as human error, negligence, lack of supervision, poor planning and coordination of activities, unattended machines, lack of experience and knowledge, use of incorrect procedures, wrong selection of equipment and timing, absence of warning signs and safety equipment and many others. The other health and safety issue is the exposure of communities and workers to dust and other particulates leading to acute respiratory infections

Mitigation measures:

- Provide all the workers with protective equipment and impose their use: equipment such as dust protection masks particularly for workers at borrow pits and mixing areas; protective clothes when dealing with hazardous substances; leather boots for all, hard hats for workers in hazardous areas and quarry; overalls and gloves for all workers; goggles and eye protectors for those working in dangerous places
- All dangerous operations should be supervised
- Erect or post danger warning or direction signs for residents and the general public to prevent confusions
- Drill staff on instructions and procedures for specific hazardous operations
- Post clear instructions and procedure on machines and operating areas to prevent accidents
- Install firefighting equipment in fire prone areas

- Ensure that comprehensive work place safety regulations are developed and used to minimize exposure of personnel and surrounding people from these dangers.

xiv. Increased cases of Sexual Exploitation and abuse (SEA) and Gender based Violence (GBV)

Construction workers will have extra disposable income that may lead to the harassment and sometimes molestation of women in general and specifically their wives. Likewise, some women working at the project sites may harass their unemployed husbands, due to increased disposable incomes. Female workers may also be harassed by the male workers at the project sites in form of abusive language and physical harassment such as demanding sex from them. Some of the community members may also be harassed in the same manner by the construction contractor employees. Similarly issues of GBV are likely to occur as a direct outcome from the project activities.

Mitigation measures:

- Ensure all workers are inducted regarding the code of conduct presented in Annex 4;
- Ensure that the code of conduct is understood and signed by each worker;
- Enforce punitive and disciplinary measures, including dismissal from employment, on any worker involved in any social malpractices; and
- Put in place proper and effective channels for reporting SEA and/or GBV related issues.
- Collaborate with the community heads and the District Social Welfare Office to sensitize communities on the ills of SEA and GBV.

xv. Increased Covid-19 infections Cases

Influx of people during road construction may increase the number of people suffering from Covid-19 which could lead in fast spread coronavirus. People with weakened immune systems and people with conditions such as diabetes, heart and lung disease are also more vulnerable.

The measures below will help prevent the spread of infections at workplace, construction sites and campsites. These measures have been developed in consultation with the Ministry of Health and the Ministry of Labour, Skills and Innovation.

Mitigation measures:

- Implement Covid-19 prevention guidelines as described in *Annex 5*.
- Make sure workplaces / Campsites are clean and hygienic. Surfaces (e.g. desks and tables) and objects (e.g. telephones, keyboards and equipment) need to be washed with soap and water or wiped with disinfectant regularly. Provide garbage disposal facilities including facilities for non-reusable PPE (used face masks).
- Promote regular and thorough hand-washing by all workers. Place hand-washing facilities at strategic locations on the workplace/campsite/construction site to ensure that workers have access to places where they can wash their hands with soap and water regularly.
- Allow all vulnerable workers including those with underlying health conditions to work from home (where possible) or stay at home. These include people with weakened immune systems and people with conditions such as diabetes, heart and lung disease and older workers.
- Display posters promoting hand-washing and all other measures in these guidelines.
- Check the temperature of all employees twice a day. Those with a low grade fever (temperature of 37.3°C or more) should be taken to the hospital for more tests. Visitors with a fever should not be permitted on site.

xvi. Destruction and alteration of the aesthetic value of the landscape

Road construction and excavation works scars the environment. It alters the aesthetic value of the landscape. This impact is more pronounced at borrow pits and quarry sites. A quarry is a type of open-pit mine from which rock or minerals are extracted. A borrow pit is an area where material (usually soil, gravel or sand) has been dug for use at another location. Borrow pits and quarries are generally used for extracting construction materials, such as dimension stone, construction aggregate, riprap, sand, and gravel. Mining scars the environment and alters the aesthetics of the environment in which it is located. Borrow pits and Quarries in most cases disfigure the physical appearance of the landscape particularly if left un-rehabilitated for too long.

Mitigation measures:

- To preserve the aesthetic beauty of the landscape at the opened borrow pits and quarry sites, at the end of borrow and quarry extraction, these sites must be rehabilitated.
- In all earthworks operations, ensure topsoil is stripped and stockpiled separately from subsoil and is reused for finishing works. Topsoil as the seed bank will allow quicker re-vegetation of the affected areas.
- Cleared areas along the project road stretch should be landscaped by planting trees and grass at the end of the construction works.

xvii. Interruption of access to social amenities and property.

The construction works of Benga-Dwangwa road will likely affect local community's access to some social amenities like football grounds, markets, water correction points, the beach, community multi-purpose halls etc.; especially when such amenities are on one side of the road. The construction works will block passage to these social amenities, and this will need to be taken in consideration in planning of construction activities.

Mitigation measures:

- Develop and implement a traffic management plan that includes provision of alternative access for the local communities to social amenities.
- Notify the local communities about the commencement of any construction activity that will affect their access to social amenities.
- The contractor to assess and identify likely interruption to access to social amenities before commencement of work.
- The contractor should work closely with community GRM committees and or local leaders in planning their activities.

xviii. Potential of child abuse / child labour

The coming in of the road project will potentially bring about or increase cases of child labour in the project area. The increased opportunities for employment and businesses to these local community may result in children being used to sell goods and services to the incoming workers and some may be hire for construction work or used by relatives who are hired by the contractor to help them with their tasks.

Mitigation measures:

- Ensuring that children and minors are not employed directly or indirectly on the project.
- Ensure that supervisors and workers sign and adhere to code of conduct
- Sensitize workers on child labour through tool box talks.
- Sensitize communities on child labour through community meeting and the use of IEC Materials.
- The contractor to develop a Child Abuse/Labour Prevention Plan.

6.4 Assessment of Environmental Impacts

Table 57 that follows presents the assessment of the identified impacts. The impacts that are deemed significant are consequently presented in the Environmental Management Plan (EMP) in which mitigation measures have been recommended.

Table 57: Potential environmental and social impact matrix for the proposed road project

Project activities	Expected impacts	Extent or magnitude	Likelihood	Duration	Overall significance
Designing phase	None	None	None	NA	NA
Construction phase					
Camps and storage sites	Air, water, and water pollution; poor sanitary conditions;	Definite	Definite	Short and medium	-2
	spread of communicable diseases such as HIH and AIDs and Cholera	Definite	Definite	Short and medium	-2
Land clearing	Loss of vegetation and top soil	Definite	Definite	Short term to medium	-1
Cut and fill operations	Siltation of streams and rivers	Definite	Definite	Short to medium	-1
Paving of shoulders and carriage way	Air pollution	Definite	Definite	Short terms	-1

Project activities	Expected impacts	Extent or magnitude	Likelihood	Duration	Overall significance
Construction of bridges	Siltation of rivers and streams	Definite	Definite	Short to medium	-3
Extraction and hauling of materials	Air pollution and land degradation	Definite	Definite	Short terms	-1
Drainage and road infrastructure	Soil erosion and siltation	Definite	Definite	Short to medium	-2
Burrow pits	Poor sanitary conditions; loss of aesthetic value	Definite	Definite	Long term	+1
Waste dump sites	Water, soil, air, water pollution; land degradation; loss of aesthetic value	Definite	Definite	Long term	+1
Asphalt plants and quarries	Water, soil and air pollution; noise	Definite	Definite	Medium	+2
Water reservoir construction	Incidences of water borne diseases	Probable	Probable	Short term	-1
General impacts	Stream flow disruption	Probable	Probable	Short term	-3
	Pollution of ground water	Possible	Possible	Short terms	-1

Project activities	Expected impacts	Extent or magnitude	Likelihood	Duration	Overall significance
	Destruction of forests and tree species	Possible	Possible	Short to medium	+1
	Destruction of endangered species	Possible	Possible	Medium to long term	+1
	Increases of Communicable diseases	Probable	Probable	Short and medium	+1
	Social cultural conflicts	Possible	Possible	Short terms	-2
	Loss of agricultural and grazing land	Possible	Possible	Medium and long term	+2
	Increased job opportunities	Possible	Possible	Short terms	-2
	Occupation health and safety hazards	Possible	Possible	Short to medium	+1
Decommission and operation phases	Waste from demolished campsites	Possible	Possible	Short terms	+1
	Stockpiles of sand, soil, stones, etc.	Possible	Possible	short terms	-2
	Influx of settlers to do business	Possible	Possible	Medium terms	-3
	High incidences of	Possible	Possible	medium	+2

Project activities	Expected impacts	Extent or magnitude	Likelihood	Duration	Overall significance
	communicable diseases				
	Increased road accidents	Possible	Possible	Long-term	+1
	Loss of tree species and forests	Probable	Probable	Long-term	+2
	Loss of employment opportunities	Probable	Probable	Medium term	-1
	Loss of aesthetic value	Possible	Possible	Long term	-2
	Poor sanitation due to borrow pits	Possible	Possible	Long term	+1

CHAPTER SEVEN: ENVIRONMENTAL AND SOCIAL MANAGEMENT OF IMPACTS

7.1. Environmental and Social Management Plan

An Environmental and Social Management Plan (ESMP) is an action plan that outlines environmental and social management measures for addressing identified impacts. The purpose of the ESMP is to provide practical solutions to the impacts identified and the monitoring of activities that need to be undertaken. The ESMP outlines environmental and social impacts, mitigation measures, monitoring and institutional measures to be taken at the project to avoid, reduce or eliminate adverse environmental impacts. The ESMP is an important tool as it provides a record against which the project can be audited in future. *Table 58* presents an Environmental and Social Management Plan for the project

Table - 58 Environmental and Social Management Plan

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
Pre-construction phase					
Positive Impacts					
Socio-economic	Creation of employment opportunities	<ul style="list-style-type: none"> • The developer shall maximise employment of professionals registered with relevant Malawian institutions and authorities. • Give equal employment opportunities for both men and women • Ensure that relevant taxes have been remitted. 	RA and RFA	Planning phase	10,000,000.00
Negative Impacts					
Socio-economic	Anxiety of loss of land and property	<ul style="list-style-type: none"> • The developer will conduct public awareness on the project and will hold consultation meetings with different stakeholders including project affected persons to seek their views on how best to 	PIU/RA	Planning and Site Clearing Phase	(As Costed in the RAP report)

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		compensate and resettle the affected persons where necessary.			
	Anxiety of temporary loss of businesses	<ul style="list-style-type: none"> The developer together with the local leaders will sensitize the community members about the project and will look for an alternative place for operating different businesses. Where necessary the owners of different businesses will be compensated accordingly for temporary loss of businesses. 			
Resettlement	Loss of property due to widening and realignment of road and carriageway.	<ul style="list-style-type: none"> All involuntary resettlement impacts (i.e. loss of land, homes, structures, crops, trees) shall be addressed through preparation of an Resettlement Action Plan (RAP); Implementation of the RAPs; 	RA		

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Create a Grievance Redress Mechanism with multiple channels. 			
Construction Phase					
Positive Impacts					
Socio-economic	Increased trading activities	<ul style="list-style-type: none"> • It is important for the PIU/RA to carry out community sensitization on business opportunities that will come about due to the project implementation. • The project unit should also conduct safety awareness regarding construction activities and how the people can conduct their businesses in a safe manner. • The Unit should consider carrying out feasible initiatives that will aim at building entrepreneurial capacities of the 	PIU/RA	During construction Phase	5,500,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		communities along the road so as to maximise this opportunity and also to be able to sustain and grow their businesses.			
	Creation of Employment opportunities	<ul style="list-style-type: none"> • Develop a robust physical development plan to sustain the job opportunities that will be created by the implementation of the project. • The proponent will have to consider employing local unskilled labour force, while paying particular attention to gender consideration of at least 40% minimum. • Enforcing the Malawi labour laws; Wages must be above the minimum wage and overtime must be paid on time. 	Contractor	During construction phase	15,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • The Contractor should engage the District Labour office in collaboration with Ministry of Labour during mobilization. • The contractor should seek guidance from the District Labour office on hiring procedures and ensure compliance concerning the same. <p>The contractor should ensure that the ADCs and VDCs are part of the processes and engagements since they are grass root level local institutions of the District Council.</p>			
	Knowledge and Skills Transfer	<ul style="list-style-type: none"> • the proponent should make a deliberate effort to employ local people from within Nkhotakota in particular the project surrounding communities. 	The Contractor	During construction Phase	8,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • The contractor should have a window for apprenticeship opportunities for students from the public and private universities to build capacities in engineering, human resource development and environmental fields. • Make deliberate effort to pair skilled and unskilled workers during various construction assignments; and formalise on-the-job trainings for local unskilled labour 			
	Payment of Taxes	The contractor will have to ensure fairly, honestly and timely remittance of the taxes to Government and procure services and goods from tax compliant businesses.	The contractor	Throughout the project	

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	Increased disposable income/ Improved Standards of Living	The consultant and contractors should endeavour to pay their workers above minimum wage set by Government at all project stages.	The contractor and consultant	Throughout the project	8,000,000.00
	Increased trade and marketing	<ul style="list-style-type: none"> • Contractor to pay construction material suppliers within the agreed time; • Source materials from approved licenced suppliers; • Support and promote entrepreneurship skills amongst communities and business people; provide safe business shelters for local businesses trading around the area; • Pay all associated taxes to the Malawi Revenue Authority; and Buy materials manufactured in Malawi. 	The contractor	Throughout the project	2,500,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
Vegetation	Clearance of vegetation and loss of Biodiversity	<ul style="list-style-type: none"> • Only the trees that interfere with construction servitude should be removed • Fire should strictly be prohibited from usage during clearing of the vegetation. • In the design, careful consideration should be given to avoiding large trees and highly vegetated areas, if feasible. • Ensure topsoil is stripped and stockpiled separately from subsoil and is reused for rehabilitation works.. • The contractor should use the existing tracks to borrow pits and quarry sites to avoid destruction of unintended vegetation • All opened borrow pits and quarries must be rehabilitated once their use for the project has come to an end. If the 	The Contractor	Throughout the project	15,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>contractor chooses to use the existing borrow pits and quarries which are currently un-rehabilitated, the contractor should rehabilitate such after completion of works.</p> <ul style="list-style-type: none"> • The contractor should develop and implement an adequate Biodiversity/Habitat Restoration plan. The restoration plan shall clearly stipulate the native tree species (or species recommended by the District Forestry Office) to be planted. • The contractor should make sure that before construction vehicles and plants arrive on site are clean and free of soils and plant material. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		The contractor to operate following a method statement especially for environmental sensitivities.			
	Destruction and alteration of the aesthetic value of the landscape	<ul style="list-style-type: none"> • To preserve the aesthetic beauty of the landscape at the opened borrow pits and quarry sites, at the end of borrow and quarry extraction, these sites must be rehabilitated. • In all earth works operations, ensure topsoil is stripped and stockpiled separate from subsoil and is reused for finishing works. Topsoil as the seed bank will allow quicker re-vegetation of the affected areas <p>Cleared areas along the project road stretch should be landscaped at the end of the construction works.</p>	The contractor	During construction Phase and post construction	2,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
Land	Loss of lands along the road reserve boundary	<ul style="list-style-type: none"> • Ensure that construction of the road is done during dry season when many people have harvested their crops to minimize the loss of their farm produce and grazing land. The RA need to conduct awareness meetings to inform the people along the road as to when the road construction works are going to start so that those who are cultivating and grazing animals along the fertile sides of the road reserve should stop. 	RA and contractor	Preconstruction phase	10,000,000.00
	Impacts of land acquisition for the quarry sites, borrow pits and asphalt plant.	<ul style="list-style-type: none"> • The contractor to do proper consultation with all relevant regulatory bodies; environmental and mining bodies, and also consult communities leaders together with the before any land is acquired. 	Contractor	Preconstruction phase	15,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • The land or sites for extraction of quarry and gravel should be acquired with proper signed permits or agreements. • The sites are to be enclosed to prevent accidents due unauthorised entry by children and other community members. <p>If possible the contractor should source quarry from already existing registered quarry miners.</p>			
Wildlife	General disturbance to wildlife	<ul style="list-style-type: none"> • No workers camps should be permitted within the wildlife reserve • The contractor and workers are not allowed to hunt, kill, capture or trap any wildlife or bird at the project sites and vicinity. 	Contractor and PIU/RA	During construction Phase	10,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • The contractor workers are not allowed to fish in the Bua River around the Nkhotakota Wildlife Reserve • The project Implementation unit should ensure that there is a person responsible to oversee project works within the wildlife reserve road section. • Regular and proper servicing of machinery and vehicles will reduce the impact of noise. <p>Within the wildlife reserve, no open excavations and trenches should be left overnight</p>			
	Interference with project area rivers and streams	<ul style="list-style-type: none"> • Ensure that the natural drainage systems are not altered. 	The Contactor	During construction Phase	20,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	riparian buffer zones	<ul style="list-style-type: none"> • All existing vegetation including trees, shrubs and undergrowth shall be allowed to remain undisturbed within the naturally vegetated buffer strip outside the work area. • Create awareness amongst the community members and collaboration with water resources users' associations about riparian protection, to help in the monitoring and protection of the rivers and riparian buffer zone. • Contractor should acquire a permit from the National Water Resources Authority (NWRA) for water abstraction of water; this should be obtained prior to use and conditions of the permission strictly observed. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Drainage systems should not be oriented directly towards the river. • The adjacent upland should be protected from high speed run-off. <p>Construction of bridges and other major earthwork works around water sources should provide for soil erosion protection measures and scheduled during dry seasons to minimize the entry of soil material into the rivers by flooding and runoff water.</p>			
	Noise and vibration	<ul style="list-style-type: none"> • Regular and proper servicing of machines and vehicles will reduce the impact noise. • Conducting work during daytime hours only, from 07:00 to 17:00, particularly for 	The Contractor	During construction Phase	20,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>delivery trucks passing through built-up areas.</p> <ul style="list-style-type: none"> • Ensuring that any disruptive activities are minimized, with prior notification to nearby residents. • Conducting joint inspections and photographing adjacent properties before and after construction activities, with agreement from property owners. Any damage incurred during the works will be reinstated to its original condition by the Contractor. 			
Waste	Improper Waste Management	<ul style="list-style-type: none"> • Contractor should develop and implement an adequate waste management plan, and the measures 	The Contractor	During construction Phase	20,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>should be developed to ensure Reuse, Recycle and reduce generated waste.</p> <p>The contractor to liaise with the Nkhotakota District Council on identification of a dumpsite.</p>			
	Impacts on soils	<ul style="list-style-type: none"> • Ensure that the Contractor are advised to limit clearing activities of the road to the areas within the road reserve. • Erosion control structures for drainage systems that collect water and discharge to natural drainage lines should be constructed. • Unwanted waste should be carefully disposed of in designated places only. • The Contractors should ensure construction of erosion and 	The Contractor	During construction Phase	50,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>sedimentation control mechanism such as diversion banks and filtration structures undertaken.</p> <ul style="list-style-type: none"> • Where necessary, rehabilitation and planting of avenue trees and grass on all slopes and unstable areas is a must. • The borrow pits, quarry sites, sand pits and others should be fully rehabilitated the end of the project in order to mitigate the negative impacts of the same. 			
	Impacts on water quality	<ul style="list-style-type: none"> • Store materials and establish campsites outside drainage lines to minimize sedimentation and pollution. 	contractor	During construction Phase	

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Plant vegetation in disturbed riparian zones • Ensure that wastes are properly dumped in designated places. • Toilets should be provided at the work and camp sites. • The contractor could use mobile chemical toilets or construct flush toilets connected to a septic tank (depending on the expected life of the camp site). • The septic tank should not be allowed to overflow and spill, but should be emptied on a regular basis for disposal at an appropriate and designated off site facility capable of handling such waste. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • The contractor should install sufficient and appropriate waste bins with lids at work and camp sites to store the waste produced on a daily basis. • Waste bins should not be allowed to overflow and should be emptied a minimum of once daily. • The waste may be temporarily stored on site in a central waste area that is weather and scavenger proof. • All waste should ultimately be disposed of at an appropriate and designated off site facility capable of handling such waste. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Vehicles, plant and machinery should be fuelled and serviced at workshops on concrete/hard surfaces. • Ensure that fuel and oils storage areas are adequately bundled and that any spills and leakages are not released to the environment • Undertake routine (quarterly) water quality tests within the project area, review in comparison with baseline data 			
	Impact on air quality	<ul style="list-style-type: none"> • It is necessary to provide dust mask and respirators to those people who operate work near machines, or work in dust prone areas and asphalt preparation or 	contractor	During construction Phase	

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>application areas so that no human health problem will be of concern.</p> <ul style="list-style-type: none"> • Ensure that air pollution regulations as provided by the EMA 2017 and other Act are fully enforced. • Vehicle standards should be maintained i.e. vehicles should be fitted with catalytic converters to reduce air pollution. • Dust impact should be minimized by occasional water sprinkling of access routes and work areas. The contractor should base on the conditions (e.g. wind direction, weather conditions) decide how many times per day should sprinkling be carried out. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • During the dry season dust pollution should be prevented by traffic calming devices to reduce travel speeds of vehicles in these sections. • Ensure that excavated materials being transported are well secured within vehicle and covered to minimise the risk of being blown by wind or spilling out due to overfilling and causing damage to other vehicles and air quality. • Regular inspection of dust emitting areas and operations is necessary. • Asphalt mixing areas should be well ventilated and all bare areas kept wet. Cover stockpiled material, which could be blown by the wind. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
Social	Displacement of properties and services	<ul style="list-style-type: none"> • A Resettlement Action Plan (RAP) is being prepared as part of this project and all affected properties will be documented and valued prior to compensation and or relocation. • In future, laws on road reserves should be strictly implemented • Educate local people on the importance of road reserves and consequences of encroaching onto them <p>Alternatively, small scale vegetables, flowers, and promotion of floriculture can be undertaken within the road reserve since the crops would not be permanent and not require costly compensation.</p>	PIU/RA	Pre-construction Phase And post-construction	Cost as in the RAP report

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	Impact on Community Health and Social Well-being	<p>The contractor / project should have a Grievance Redress Mechanism in place.</p> <p>The contractor employees must all sign a code of conduct</p> <p>Cases of abuse should be reported to the police for investigation and prosecution.</p> <p>Implement comprehensive sexual and reproductive health education programs in schools and community settings to raise awareness and promote responsible behavior.</p> <p>Strengthen access to reproductive health services, including family planning counseling and contraceptive services, to empower individuals to make informed choices about their reproductive health.</p>	Contractor	Throughout the project	16,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		Engage community leaders, religious institutions, and other stakeholders in promoting gender equality and addressing cultural norms and practices that contribute to early pregnancies. Foster economic empowerment opportunities for young women and girls to reduce their vulnerability to exploitation and dependence on potentially harmful relationships			
	Increased cases of Sexual Exploitation and abuse (SEA) and Gender based Violence (GBV)	<ul style="list-style-type: none"> • Ensure all workers are inducted regarding the code of conduct presented in Annex 5 • Ensure that the code of conduct is understood and signed by each worker; 	The contractor,	During construction Phase	30,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Enforce punitive and disciplinary measure including dismissal from employment, on any worker involved in any social malpractices; and • Put in place proper and effective channels for reporting SEA and/or GBV related issues. <p>Collaborate with the community heads and the District Social Welfare Office to sensitize communities on the ills of SEA and GBV.</p>			
Health and Safety	Disruption of traffic	<ul style="list-style-type: none"> • Adequate signage is required to warn motorists of the presence of contractor vehicles and machinery on the road and of the road diversions. 	Contractor	During construction Phase	20,000,000

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Contractor vehicles and machinery should use designated access routes to and from work sites to minimize disruption. • A maximum speed limit of 50km/h should be applied to all contractor vehicles within the project area. • It is desirable that traffic police be visible along the project road stretch to enforce the Road Traffic Act. • Contractor should to develop and implement a traffic management plan. 			
	Exposure Occupational health and safety	<ul style="list-style-type: none"> • Provide all the workers with protective equipment and impose their use. • All dangerous operations should be supervised 	The contractor	During construction Phase	30,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Erect or post danger warning or direction signs for residents and the general public to prevent confusions • Drill staff on instructions and procedures for specific hazardous operations • Post clear instructions and procedure on machines and operating areas to prevent accidents • Install firefighting equipment in fire prone areas <p>Ensure that comprehensive work place safety regulations are developed and used to minimize exposure of personnel and surrounding people from these dangers.</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	Increased Covid-19 infections Cases	<ul style="list-style-type: none"> • Implement Covid-19 prevention guideline as described in Annex 6. • Make sure workplaces / Campsites are clean and hygienic. Surfaces (e.g. desks and tables) and objects (e.g. telephones, keyboards and equipment) need to be wiped with disinfectant regularly. Provide garbage disposal facilities including facilities for non-reusable PPE (used face masks). • Promote regular and thorough hand-washing by all workers. Place hand-washing facilities at strategic locations at the workplace/campsite/construction site. • Allow all vulnerable workers including those with underlying health conditions to work from home (where possible) or stay 	The contractor	During construction Phase	20,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>at home. These include people with weakened immune systems and people with conditions such as diabetes, heart and lung disease and older workers.</p> <ul style="list-style-type: none"> • Display posters promoting hand-washing and all other measures in these guidelines. <p>Check the temperature of all employees twice a day. Those with a low-grade fever (temperature of 37.3°C or more) should be taken to the hospital for more tests. Visitors with a fever should not be permitted on site.</p>			
	Increased incidence of sexually transmitted illnesses (STIs)	<ul style="list-style-type: none"> • The contractor should be encouraged to source unskilled labour from the project area and minimize the need to import labour from outside the project area. 	The contractor	During construction Phase	25,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	including HIV and AIDS	<ul style="list-style-type: none"> • The contractor should comply with national and district health and safety initiatives, guidelines, programmes, policies and legislation • A fully fledged HIV/AIDS programme should be implemented both for the contractor staff and the residents of the project area. Ideally this should comprise education before the implementation of the project, followed by programmes during construction including distribution of condoms, voluntary testing and counselling and appropriate treatment. • Pamphlets and other HIV/AIDS material should always be available and displayed at the site offices. 			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> Communities around the project area should be reached out to with HIV/AIDS prevention information through use of media (print and electronic) and other appropriate IEC materials (e.g. T-shirts, caps, flyers, newsletters etc). The community members especially female should be taught skills for negotiating for safer sex. <p>NGOs such as Action Aid International Malawi, churches and mosques should intensify their HIV/AIDS awareness campaigns in the project area.</p>			
	Interruption of access to social amenities and property.	<ul style="list-style-type: none"> Develop and implement a traffic management plan that includes provision 	Contractor	During construction Phase	10,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<p>of alternative access for the local communities to social amenities.</p> <ul style="list-style-type: none"> • Notify the local communities about the commencement of any construction activity that will affect their access to social amenities. • The contractor to assess and identify likely interruption to access to social amenities before commencement of work. <p>The contractor should work closely with community GRM committees and or local leaders in planning their activities.</p>			
	Potential of child abuse / child labour	<ul style="list-style-type: none"> • Ensuring that children and minors are not employed directly or indirectly on the project. 	The Contractor	During construction Phase	5,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Ensure that supervisors and workers sign and adhere to code of conduct • Sensitize workers on child labour through tool box talks. • Sensitize communities on child labour through community meeting and the use of IEC Materials. <p>The contractor to develop a Child Abuse/Labour Prevention Plan.</p>			
	Impacts from workers' camps	<ul style="list-style-type: none"> • Camp location and design should not be close to environmental sensitive areas like forested areas, natural water body, Wildlife Reserve but at the same time considering the future use of the facilities upon handing over of the project. 	The Contractor,	Pre-construction phase	

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Consultation with the local administration shall be done to assist in identification of the appropriate camp site that can serve dual purposes. <p>The contractor to have a proactive working relationship with the community's GRM committee.</p>			
	Potential social impacts due to Population/Labour Influx	<ul style="list-style-type: none"> • Employ most of the unskilled workforce from the local communities who already have homes within the project area and therefore live with their families. • Orient immigrant workers on the tradition of the area in collaboration with the T/As and Village headmen. <p>All contractor to sign and adhere to the code of conduct.</p>	The Contractor	During construction Phase	3,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Responsible institution	Time Frame	Estimated Cost (MK)
	Non-Compliance to implementation of ESMP	Hiring Consultant for independent Annual Environmental Audit.	PIU/RA	During construction	20,000,000.00
					576,000,000.00

7.2. Environmental and Social Monitoring Plan

In order to ensure that environmental considerations are integrated into the project activities, environmental monitoring should be carried out at regular intervals as part of the project activities. *Table 59* is a Project Environmental Monitoring Plan and it essentially will assist to:

- Measure the attainment (success or failure) of mitigation measures to perfect the foreseen impacts;
- Spot unforeseen impacts; and
- Facilitate better environmental management of the project.

Table - 59 Environmental and Social Monitoring Plan

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
Pre-construction phase						
Positive Impacts						
Socio-economic	Creation of employment opportunities	<ul style="list-style-type: none"> The developer shall maximise employment of professionals registered with relevant Malawian institutions and authorities. Give equal employment opportunities for both men and women <p>Ensure that relevant taxes have been remitted</p>	Number of local people employed	PIU/RA	Every month	1,000,000.00
Negative Impacts						
Socio-economic	Anxiety of loss of land and property	The developer will conduct public awareness on the project and will hold consultation meetings with different stakeholders including	Number of consultation meetings and	RA	Quarterly	5,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		project affected persons to seek their views on how best to compensate and resettle the affected persons where necessary.	size of land acquired			
	Anxiety of temporary loss of businesses	The developer together with the local leaders will sensitize the community members about the project and will look for an alternative place for operating different businesses. Where necessary the owners of different businesses will be compensated accordingly for temporary loss of businesses.	Number of consultation meetings and size of land acquired	RA	Quarterly	5,000,000.00
Resettlement	Loss of property due to widening and realignment	<ul style="list-style-type: none"> All involuntary resettlement impacts (i.e. loss of land, homes, structures, crops, trees) shall be addressed 	Number of consultation meetings and	PIU/RA	Quarterly	5,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	of road carriageway.	through preparation of an Resettlement Action Plan (RAP); • Implementation of the ARAPs; Create a Grievance Redress Mechanism with multiple channels.	size of land acquired			
Construction Phase						
Positive Impacts						
	Increased trading activities	<ul style="list-style-type: none"> It is important for the Project implementation unit to carry out community sensitization on business opportunities that will come about due to the project implementation. The Unit should also conduct safety awareness regarding construction activities and how the people can conduct their businesses in a safe manner. 	<p>A notable increase in trading activities</p> <p>And Records/reports of awareness campaigns</p>	PIU/RA	Quarterly	2, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> The Unit should consider carrying out feasible initiatives that will aim at building entrepreneurial capacities of the communities along the road so as to maximise this opportunity and also to be able to sustain and grow their businesses. 				
	Creation of Employment opportunities	<ul style="list-style-type: none"> Develop a robust physical development plan to sustain the job opportunities that will be created by the implementation of the project. The proponent will have to consider employing local unskilled labour force, while paying particular attention to gender consideration of at least 40% minimum. 	Number of local people employed	The contractor	Quarterly	5, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Enforcing the Malawi labour laws; Wages must be above the minimum wage and overtime must be paid on time. • The Contractor should engage the District Labour office in collaboration with Ministry of Labour during mobilization. • The contractor should seek guidance from the District Labour office on hiring procedures and ensure compliance concerning the same. <p>The contractor should ensure that the ADCs and VDCs are part of the processes and engagements since they are grass root level local institutions of the District Council.</p>				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	Knowledge and Skills Transfer	<ul style="list-style-type: none"> The proponent should make a deliberate effort to employ local people from within Nkhotakota in particular the project surrounding communities. The contractor should have a window for apprenticeship opportunities for students from the public and private universities to build capacities in engineering, human resource development and environmental fields. <p>Make deliberate effort to pair skilled and unskilled workers during various construction assignments; and Formalise on-the-</p>	<p>Number of local people employed</p> <p>Number of college interns</p> <p>Number of unskilled workers paired with skilled workers</p>	PIU, Contractor and supervising consultant	Monthly	4,000,000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		job trainings for local unskilled labour				
	Payment of Taxes	The contractor will have to ensure fairly, honestly and timely remittance of the taxes to Government and procure services and goods from tax compliant businesses.	The amount of taxes paid with evidence of receipts	RA/RFA	Quarterly	1, 000,000.00
	Increased disposable income/ Improved Standards of Living	The consultant and contractors should endeavour to pay their workers above minimum wage set by Government at all project stages.	Presence of signed pay slips/sheets, with wages above minimum wage	PIU/RA and Contractor	Quarterly	3, 000, 000.00
	Increased trade and marketing	• Contractor to pay construction material suppliers within the agreed time;	Evidence of payment (MRA receipts)	PIU/RA and the contractor	Quarterly	2, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Source materials from approved licenced suppliers; • Support and promote entrepreneurship skills amongst communities and business people; provide safe business shelters for local businesses trading around the area; Pay all associated taxes; and Buy materials manufactured in Malawi.				
Negative Impacts						
	Clearance of vegetation and loss of Biodiversity	<ul style="list-style-type: none"> • Only the trees that interfere with construction servitude should be removed • Fire should strictly be prohibited from usage during clearing of the vegetation. 	Area cleared Use of fire during clearing of vegetation	PIU/RA	Quarterly And at the end of the construction phase	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • In the design, careful consideration should be given to avoiding large trees and highly vegetated areas, if feasible. • Ensure topsoil is stripped and stockpiled separately from subsoil and is reused for rehabilitation works. • The contractor should use the existing tracks to borrow pits and quarry sites to avoid destruction of unintended vegetation • All opened borrow pits and quarries must be rehabilitated once their use for the project has come to an end. If the contractor chooses to use the existing borrow pits and quarries 	<p>Number of trees replanted</p> <p>Number of unrehabilitated borrow pits</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>which are currently unrehabilitated the contractor should rehabilitate such after completion of works.</p> <ul style="list-style-type: none"> • The contractor should develop and implement an adequate Biodiversity/Habitat Restoration plan. The restoration plan shall clearly stipulate the native tree species (or species recommended by the District Forestry Office) to be planted. • The contractor should make sure that before construction vehicles and plants arrive on site are clean and free of soils and plant material. <p>The contractor to operate following a method statement</p>				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		especially for environmental sensitivities.				
	Loss of lands along the road reserve boundary	<ul style="list-style-type: none"> Ensure that construction of the road is done during dry season when many people have harvested their crops to minimize the loss of their farm produce and grazing land. <p>The RA need to conduct awareness meetings to inform the people along the road as to when the road construction works are going to start so that those who are cultivating and grazing animals along the fertile sides of the road reserve should stop.</p>	Number of consultation meetings and size of land acquired	PIU/RA	once	1, 000, 000.00
	Impacts of land	<ul style="list-style-type: none"> The contractor to do proper consultation with all relevant 	Presence of signed permits	PIU/RA	Quarterly	5, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	acquisition for the quarry sites, borrow pits and asphalt plant.	<p>regulatory bodies; environmental and mining bodies, and also consult communities leaders together with the before any land is acquired.</p> <ul style="list-style-type: none"> • The land or sites for extraction of quarry and gravel should be acquired with proper signed permit or agreements. • The sites are to be enclosed to prevent accidents due unauthorised entry by children and other community members. <p>If possible, the contractor should source quarry from already existing registered quarry miners.</p>				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	General disturbance to wildlife	<ul style="list-style-type: none"> • No workers camps should be permitted within the wildlife reserve • The contractor and workers are not allowed to hunt, kill, capture or trade any wildlife or bird at the project sites and vicinity. • The contractor workers are not allowed to fish in the Bua River around the Nkhotakota Wildlife Reserve • The project implementation Unit should ensure that there is a person responsible to oversee project work within the wildlife reserve road section 	<p>Presence of camp within the wildlife reserve</p> <p>Contractor workers hunting, killing, capturing wildlife</p> <p>Contractor workers fishing in Bua</p>	The contractor	Once every month	4, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> Regular and proper servicing of machinery and vehicles will reduce the impact of noise. <p>Within the wildlife reserve, no open excavations and trenches should be left overnight</p>				
	Interference with project area rivers and streams riparian buffer zones	<ul style="list-style-type: none"> Ensure that the natural drainage systems are not altered. All existing vegetation including trees, shrubs and undergrowth shall be allowed to remain undisturbed within the naturally vegetated buffer strip outside the work area Create awareness amongst the community members and collaboration with water resources users' associations about riparian 	<p>Altered natural drainage</p> <p>Disturbed natural vegetated buffer strip</p>	The contractor	Quarterly	4, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>protection, to help in the monitoring and protection of the rivers and riparian buffer zone.</p> <ul style="list-style-type: none"> • Contractor should acquire a permit from the National Water Resources Authority (NWRA) for water abstraction of water; this should be obtained prior to use and condition of the permission strictly observed. • Drainage systems should not be oriented directly towards the river. The adjacent upland should be protected from high-speed run-off. Construction of bridges and other major earthwork works around water sources should provide for soil erosion protection measures 				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		and scheduled during dry seasons to minimize the entry of soil material into the rivers by flooding and runoff water.				
	Noise and vibration	<ul style="list-style-type: none"> • Regular and proper servicing of machinery and vehicles will reduce the impact of noise. • Conducting work during daytime hours only, from 07:00 to 17:00, particularly for delivery trucks passing through built-up areas. • Ensuring that any disruptive activities are minimized, with prior notification to nearby residents. • Conducting joint inspections and photographing adjacent properties before and after construction 	<p>Number of unserviced machinery and vehicles</p> <p>Available of maintenance schedule records</p> <p>Number of grievances of noise and vibrations</p>	PIU / Supervising Consultant	Quarterly	6, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		activities, with agreement from property owners. Any damage incurred during the works will be reinstated to its original condition by the Contractor.				
	Improper Waste Disposal: Impacts of waste on soils	<ul style="list-style-type: none"> • Unwanted waste should be carefully disposed of in designated places only. • Where necessary, rehabilitation and planting of avenue trees and grass on all slopes and unstable areas is a must. • The borrow pits, quarry sites, sand pits and others should be fully rehabilitated at the end of the project in order to mitigate the negative impacts of the same. 	Presence of improperly disposed waste Number of avenue trees planted Number of unrehabilitated borrow pits, quarry sites.	PIU and Contractor	monthly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	Improper Waste Disposal: Impacts of waste on water quality	<ul style="list-style-type: none"> • Store materials and establish campsites outside drainage lines so to minimize sedimentation and pollution • ensuring that construction activities take place during the dry season when precipitation is at lowest levels. • Plant vegetation in disturbed riparian zones • Ensure that wastes are properly dumped in designated places. Since Nkhotakota District does not have dumping site, there is need for the Contractor to discuss and agree with the District Council to designate 	<p>Presence of improperly disposed waste</p> <p>Vegetation planted in disturbed riparian zones</p> <p>Number of toilets at the work and camp site</p> <p>Number of times the septic tank is cleaned to avoid sludging</p>	PIU and Contractor	monthly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>some areas where waste can be dumped.</p> <ul style="list-style-type: none"> • Toilets should be provided at the work and camp sites. No pit latrines are allowed to be constructed at these sites as pit latrines are known to contaminate ground water quality. The contractor could use mobile chemical toilets or construct flush toilets connected to a septic tank (depending on the expected life of the camp site). • The septic tank should not be allowed to overflow and spill, but should be emptied on a regular basis for disposal at an appropriate and 	<p>Presences of Waste bins with lids</p> <p>Presence of concrete base and enclosed oil storage areas</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>designated off site facility capable of handling such waste.</p> <ul style="list-style-type: none"> • The contractor should install sufficient and appropriate waste bins with lids at work and camp sites to store the waste produced on a daily basis. • Waste bins should not be allowed to overflow and should be emptied at a minimum of once daily. The waste may be temporarily stored on site in a central waste area that is weather and scavenger proof. • No burying and burning of waste will be permitted. All waste should ultimately be disposed of at an 				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization/institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>appropriate and designated off site facility.</p> <ul style="list-style-type: none"> • Vehicles, plant and machinery should be fuelled and serviced at workshop on concrete/hard surfaces so that any oil spillage is drained onto a catch-pit or container for disposal at an appropriate and designated off site facility capable of handling such waste. No servicing of vehicles and machinery should be carried out at work sites. • Ensure that fuel and oils storage areas are adequately bundled and that any spills and leakages are not released to the environment but retained in sealed containers for 				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		disposal at an appropriate and designated off site facility.				
	Improper Waste Disposal: Impact on air quality	<ul style="list-style-type: none"> It is necessary to provide dust mask and respirators to those people who operate or work near machines, or work in dust prone areas and asphalt preparation or application areas so that no human health problem will be of concern. Ensure that air pollution regulations as provided by the EMA 2017 and other Acts are fully enforced. Vehicle standards should be maintained i.e. vehicles should be fitted with catalytic converters to reduce air pollution. 	<p>Presence of improperly disposed waste</p> <p>Number of workers working without masks in dust prone areas</p> <p>Number of vehicles with catalytic converters</p>	PIU/RA	monthly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Dust impact should be minimized by occasional water sprinkling of access routes and work areas. The contractor should base on the conditions (e.g. wind direction, weather conditions) decide how many times per day should sprinkling be carried out. • During the dry season dust pollution should be prevented by traffic calming devices to reduce travel speeds of vehicles in these sections. • Ensure that excavated materials being transported are well secured within vehicles and covered to minimise the risk of being blown by wind or spilling out due to 	<p>Number of grievances lodge about dust</p> <p>Number of times water is sprinkled on the roads per day</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		overfilling and causing damage to other vehicles and air quality. <ul style="list-style-type: none"> • Regular inspection of dust emitting areas and operations is necessary. • Asphalt mixing areas should be well ventilated and all bare areas kept wet. • Cover stockpiled material, which could be blown by the wind. 				
	Displacement of properties and services	<ul style="list-style-type: none"> • A Resettlement Action Plan (RAP) is being prepared as part of this project and all affected properties will be documented and valued prior to compensation and or relocation • In future, laws on road reserves should be strictly implemented 	Number of PAPs Number of sensation meeting about the road reserves	PIU/RA	once	2, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> Educate local people on the importance of road reserves and consequences of encroaching onto them Alternatively, small scale vegetables, flowers, and promotion of floriculture can be undertaken within the road reserve since the crops would not be permanent and not require costly compensation. 				
	Increased incidence of sexually transmitted illnesses (STIs) including	<ul style="list-style-type: none"> The contractor should be encouraged to source unskilled labour from the project area and minimize the need to import labour from outside the project area. The contractor should comply with national and district health and 	Number of sensitization meetings on HIV and AIDS	The contractor	Quarterly	10, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	HIV and AIDS	<p>safety initiatives, guidelines, programmes, policies and legislation</p> <ul style="list-style-type: none"> • A fully fledged HIV/AIDS programme should be implemented both for the contractor staff and the residents of the project area. Ideally this should comprise of education before the implementation of the project, followed by programmes during construction including distribution of condoms, voluntary testing and counselling and appropriate treatment. • Pamphlets and other HIV/AIDS material should always be available and displayed in the site offices. 	<p>Number of HIV and AIDS cases reported</p> <p>Presence of IEC material on site</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Communities around the project area should be reached out to with HIV/AIDS prevention information through use of media (print and electronic) and other appropriate IEC materials (e.g. T-shirts, caps, flyers, newsletters etc). • The community members especially females should be taught skills for negotiating for safer sex. • NGOs such as Action Aid International Malawi, churches and mosques should intensify their HIV/AIDS awareness campaigns in the project area. 				
	Impact on Community	<ul style="list-style-type: none"> • It is recommended that the project educate pupils/students on the risks 	Number of unplanned	The contractor	Quarterly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	Health and Social Well-being	<p>of unplanned pregnancies and family planning. Also, moral education in schools should not shy away from issues of sex.</p> <ul style="list-style-type: none"> The schools in consultation with parents ought to decide on whether condoms and other family planning paraphernalia can be made accessible to pupils/students. 	<p>pregnancies case reported</p>			
	Disruption of traffic	<ul style="list-style-type: none"> Adequate signage is required to warn motorists of the presence of contractor vehicles and machinery on the road and of the road diversions. Contractor vehicles and machinery should use designated 	<p>Presence of adequate signage</p> <p>Number of traffic accidents reported</p>	PIU and supervising consultant	Throughout the construction phase	5, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>access routes to and from work sites to minimize disruption.</p> <ul style="list-style-type: none"> • A maximum speed limit of 50km/h should be applied to all contractor vehicles within the project area. • It is desirable that traffic police be visible along the project road stretch to enforce the Road Traffic Act. 				
	Exposure Occupational health and safety	<ul style="list-style-type: none"> • Provide all the workers with protective equipment and impose their use. • All dangerous operations should be supervised 	<p>Presence of workers without PPE on site</p> <p>Number of people trained in occupational health and safety</p>	The contractor	Monthly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> • Erect or post danger warning or direction signs for residents and the general public to prevent confusion • Drill staff on instructions and procedures for specific hazardous operations • Post clear instructions and procedures on machines and operating areas to prevent accidents • Install firefighting equipment in fire prone areas • Ensure that comprehensive work place safety regulations are developed and used to minimize exposure of personnel and surrounding people from these dangers. 	<p>Number of occupation accidents recorded</p> <p>Presence of firefighting equipment on site</p>			

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
	Increased cases of Sexual Exploitation and abuse (SEA) and Gender based Violence (GBV)	<ul style="list-style-type: none"> • Ensure all workers are inducted regarding the code of conduct presented in Annex 5; • Ensure that the code of conduct is understood and signed by each worker; • Enforce punitive and disciplinary measures, including dismissal from employment, on any worker involved in any social malpractices; and • Put in place proper and effective channels for reporting SEA and/or GBV related issues. • Collaborate with the community heads and the District Social Welfare 	<p>Number of reported cases of SEA and GBV</p> <p>Presence of signed code of conduct</p>	The contractor	Quarterly	15, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		Office to sensitize communities on the ills of SEA and GBV.				
	Increased Covid-19 infections Cases	<ul style="list-style-type: none"> • Implement Covid-19 prevention guidelines as described in Annex 6. • Make sure workplaces / Campsites are clean and hygienic. Surfaces (e.g. desks and tables) and objects (e.g. telephones, keyboards and equipment) need to be wiped with disinfectant regularly. Provide garbage disposal facilities including facilities for non-reusable PPE (used face masks). • Promote regular and thorough hand washing by all workers. Place hand washing facilities at strategic locations at the 	<p>Presence of hand washing facilities</p> <p>Enforcement of preventive guidelines</p> <p>Presence and use of thermometer</p>	Contractor	Quarterly	8, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<p>workplace/campsite/construction site.</p> <ul style="list-style-type: none"> • Allow all vulnerable workers including those with underlying health conditions to work from home (where possible) or stay at home. These include people with weakened immune systems and people with conditions such as diabetes, heart and lung disease and older workers. • Display posters promoting hand-washing and all other measures in these guidelines. • Check the temperature of all employees twice a day. Those with low-grade fever (temperature of 				

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		37.3°C or more) should be taken to the hospital for more tests. Visitors with a fever should not be permitted on site.				
	Destruction and alteration of the aesthetic value of the landscape	<ul style="list-style-type: none"> To preserve the aesthetic beauty of the landscape at the opened borrow pits and quarry sites, at the end of borrow and quarry extraction, these sites must be rehabilitated. In all earth works operations, ensure topsoil is stripped and stockpiled separately from subsoil and is reused for finishing works. Topsoil as the seed bank will allow quicker re-vegetation of the affected areas. 	<p>Number of unrehabilitated borrow pits</p> <p>Re-vegetated and landscaped area at end of construction work</p>	PIU and Contractor	Quarterly and at the end of the construction works	5, 000, 000.00

Environmental Component/ Aspect	Expected Impacts	Mitigation/Enhancement Measures	Monitoring indicator	Responsible Organization institution	Frequency of Monitoring	Estimated Cost (MK)
		<ul style="list-style-type: none"> Cleared areas along the project road stretch should be landscaped at the end of the construction works. 				
Total Cost						195, 840, 000.00

7.3. Contractors ESMP and Management Strategy Implementation Plans (MSIPs)

The preparation of Contractors Environmental and Social Management Plan (C-ESMP) and MSIPs is a mandatory requirement as per the policies of the AfDB. The contractor is responsible for developing more than ten relevant MSIPs tailored to address specific concerns applicable to this project. The following are the MSIPs expected to be prepared by the contractor:

- i. Code of Conduct
- ii. Borrow pit management and restoration/rehabilitation plan
- iii. Dumping sites management and restoration/rehabilitation plan
- iv. Waste management Plan
- v. Traffic management Plan
- vi. Emergency Preparedness and response plan
- vii. Occupational Health and Safety management plan
- viii. Public Health and Safety management plan
- ix. Camp Site Management plan
- x. Labor Influx Management plan
- xi. Grievance Redress Mechanism (GRM)
- xii. GBV reporting protocol
- xiii. Water Resources Protection and Management Plan
- xiv. Noise and Vibrations management plan
- xv. Erosion and Sediment Control Management Plan (ESC MP)
- xvi. Public Consultation and Disclosure Plan (PCDP)
- xvii. Sexual Harassment Prevention and Response Plan
- xviii. Vulnerable Groups Engagement Plan
- xix. Stakeholders Engagement Plan (SEP)

The Preparation of these MSIPs will be contractual between the contractor and client (RA).

7.3.1. Code of Conduct

To sustain the business and allow it to develop properly, Contractor should act responsibly not only by complying with applicable legal and regulatory requirements but also in terms of how employees are treated and business partners and care for the ESHS aspects including human environment. The overall objective of implementing the Code of Conduct is to assist in meeting the following targets:

- i. Sustainability, good corporate governance and continual improvement in the effectiveness of our processes to reduce risk to the company's performance;
- ii. Eliminating illegal and anti-competitive practices;
- iii. Full compliance with all ESHS legal and regulatory requirements in each area of operation;
- iv. Achieving benefits in staff morale and positive feedback on our relationship with employees, business partners and communities in which we operate;
- v. Undertaking initiatives to promote greater ESHS responsibility for sustainable development; and
- vi. Making a positive contribution to improving ESHS standards of integrity, transparency and accountability.

7.3.2. Borrow Pit management and Restoration/Rehabilitation Plan

The contractor is responsible for assessing borrow pit activities that may disrupt natural drainage patterns and societal balance. Therefore, borrow pits will be rehabilitated to return to their pre-existing conditions, and mitigation measures will be developed and implemented during this process.

7.3.3. Dumping Sites Management and Restoration/Rehabilitation Plan

Construction works will generate various waste solid, liquid waste and bio-and-non-bio-degradable waste that may pollute the environment. Wastes, if not properly managed may block access roads and act as breeding place for vectors such as mosquitoes and flies that may facilitate transmission of diseases such Malaria and Diarrhea respectively. The contractor will liaise with Nkhotakota District Council regarding a proper place for dumping project waste.

7.3.4. Waste Management Plan

During implementation of them project, the contractor will institute a waste management system for the site. All wastes shall be disposed of offsite at a designated dumping site in consultation with the District Council. Burning of any waste on any construction site is forbidden. The contractor shall supply waste bins at the campsite and at locations where construction personnel are working. The bins shall be provided with lids and an external closing mechanism to prevent their contents from being blown out and shall be scavenger-proof to keep out other animals that may be attracted due to availability of waste the project site. The contractor shall ensure that all

personnel immediately deposit all wastes in the waste bins for removal. Bins shall be emptied on a daily basis and waste removed to a temporary waste storage yard/site where the waste shall be properly contained until final disposal. The bins shall be colour-coded and will not be used for any other purposes other than waste storage. The contractor will ensure that there are no emissions of noxious or offensive substances into the air, land and water. Among others, the contractor shall in particular, comply with the Waste Management Regulations 2008 and local bye laws for disposal of empty cement bags, construction/demolition wastes, combustion products, dust, metals, rubble and timber.

7.3.5. Traffic Management Plan

The construction of the road will require significant movement of traffic to facilitate haulage of materials, movement of equipment, and deployment of project personnel from one point to the other to undertake various project related tasks and removal of waste from construction sites to designated disposal sites. To facilitate these functions, project traffic has to utilize public roads, open access routes, and community spaces for movement. In so doing, there is potentially dangerous interaction between project vehicles and regular traffic and communities. There is also a need for controlled traffic movements inside facilities such as the campsite.

7.3.6. Emergency Preparedness and Response Plan

The contractor will ensure there the site has a first aid box and a well trained first aider who can provide support to minor emergencies. The contractor will make special arrangement with Nkhotakota District Health Office where it may refer major health emergencies for support. In addition to reporting to their immediate supervisors all employees will be sensitized and encouraged to contact a designated person whose contact will be displayed on the notice board for any emergencies. A proper emergency prepared plan will be prepared and shared with all relevant stakeholders.

7.3.7. Occupational Health and Safety Management Plan

In line with Occupational Safety, Health and Welfare Act, 1997, the contractor will provide a safe work place for its employees. Besides training of employees in safe work procedures and providing PPE, the contractor will encourage its employees to report all work situations that are believed not to be safe or healthy. Any employee is encouraged to remove himself/herself from

a work situation which he/she reasonably believes presents an imminent and serious danger to his/her life or health. The contractor will always be guided by and adhere to the relevant national safety cardinal rules on the site and will keep first aid kits to be administered by a trained first aiders at the project sites. All workers will also be provided with clean potable water and other amenities.

7.3.8. Public Health and Safety Management Plan

The construction of road will affect several aspects of the general public. The population around the area will increase due to influx of people coming to look for employment. Some of these people will bring with them negative social behaviors such as stealing, prostitution, and womanizing which can result into increase in HIV and AIDS and COVID-19 cases. The project area will also experience an increase in number of vehicles and machines that shall be providing goods, raw materials and services to the construction activities. If not properly managed, these can run into a person (project worker or community members) and bring about morbidity or even fatalities. The contractor will provide mitigation measures of these negative impacts in order to ensure public health and safety.

7.3.9. Camp Site Management Plan

The project campsite will accommodate people of diverse background and cultural beliefs which may give rise to misunderstanding among them. Continuous stay of these people at the campsite will generate waste which if not well managed can give rise to health issues. It is obvious that the campsite will give rise to lots of adverse impacts that require a proper plan in place to manage them.

7.3.10. Labor Influx Management Plan

The construction of road will require a workforce of over 300 people. The project will involve civil works for which the required labour force and associated goods and services will not be fully supplied locally due to unavailability and lack of technical skills and capacity. In this case, the labour force especially skilled labour will need to be brought in from outside the project area. This influx may be compounded by an influx of other people ("followers") who follow the incoming workforce to sell goods and services, or in pursuit of job or business opportunities. These can bring several negative impacts such as increased demand and competition for local

social and healthcare services and goods and services which can lead to price hikes and crowding out of local consumers, increased volume of traffic and a higher risk of accidents, increased demands on the ecosystem and natural resources, social conflicts within and between communities, increased risk of gender-based violence, sexual exploitation, and abuse, the spread of communicable diseases, and increased rates of illicit behaviour and crime. The contractor will have to provide mitigation measures for such impacts.

7.3.11. GBV Reporting Protocol

Issues of gender-based violence are common in construction site and this project is not spared. The contractor shall make sure that it doesn't tolerate any gender related issues during construction of the road. The contractor will fully support the client's social and gender program implementation at the project site and surrounding communities.

7.3.12. Water Resources Protection and Management Plan

During construction of the road, there shall be a lot of waste generated some of which may end up polluting the existing water sources and give rise to serious health issues. Heaps of construction materials such as gravel and other excavated materials can be vehicle by run off and sediment into water drainage systems making them shallower and later on contribute to risk of flooding in the district. The contractor will provide mitigation measures for protection sensitive biological and ecological resources.

7.3.13. Noise and Vibrations Management Plan

The project will generate noise and vibrations which can be hazardous to health. The contractor will ensure that proper mitigation measures are put in place to control excess emission of noise and vibration. To avoid disturbing the surrounding community from peaceful sleep, all works shall be performed during day time. The contractor will also ensure that the noise producing machines are well serviced and where possible provided with noise control devices to reduce excess emission.

7.3.14. Erosion and Sediment Control Management Plan (ESCP)

The contractor will avoid unnecessary cutting down of trees or removal of natural vegetative cover to enhance environmental conservation and minimize soil erosion. Efforts shall be made to enforce a strict prohibition on the washing of vehicles or changing of lubricants in waterways or wetlands. Similarly, the contractor shall ensure that no operation may lead to erosion or degradation of water resource systems for both physical and chemical aspects which may affect the aquatic habitat. The contractor will provide mitigation measures.

7.3.15. Sexual Harassment Prevention and Response Plan (SHPRP)

The contractor will prepare C-ESMP which will include a dedicated sub-management plan for Sexual Harassment Prevention and Response. This plan underscores commitment to creating a safe and respectful work environment on the bridge construction project. It will outline policies, objectives, prevention measures, reporting mechanisms, investigation procedures, response actions, and support for victims. Regular training and awareness campaigns will be conducted, and a confidential reporting system will be established. Individuals found responsible for sexual harassment will face appropriate disciplinary actions.

This plan serves as a critical component of broader commitment to environmental and social responsibility on the project site. It will be submitted for approval before the commencement of construction activities.

7.3.16. Vulnerable Groups Engagement Plan

The contractor will prepare a dedicated Vulnerable Groups Engagement Plan. This plan will outline strategies for engaging with and addressing the specific needs of vulnerable groups, including women, youth, and people living with disabilities. It will emphasize their inclusion in project activities, training, and employment opportunities, ensuring that their voices are heard, and their concerns are addressed throughout the project lifecycle. The Inclusion Strategies for Vulnerable Groups are discussed below:

1. **Employment Opportunities:** The project will actively seek to provide employment opportunities for vulnerable groups, ensuring their fair representation in the workforce.

Special recruitment drives will be conducted to encourage the hiring of women, youth, and individuals with disabilities.

2. **Accessible Facilities:** The project will prioritize accessibility by ensuring that workplaces and facilities are physically accessible to people with disabilities. This includes providing ramps, accessible toilets, and other necessary accommodations.
3. **Community Engagement:** Regular community engagement sessions will be conducted to involve vulnerable groups in project decision-making processes. Their feedback and concerns will be actively sought and addressed.
4. **Safety and Well-being:** Special attention will be given to the safety and well-being of vulnerable groups. This includes addressing concerns related to their physical safety, health, and overall welfare while engaged in project activities.
5. **Consultation Channels:** Multiple channels for consultation will be established to ensure that the voices of vulnerable groups are heard. This may include dedicated community meetings, and direct communication channels.
6. **Reporting Mechanisms:** Grievance redress mechanisms will be established to allow vulnerable groups to report any issues or concerns they may encounter during the project. These mechanisms will guarantee a timely response and resolution of problems.

7.3.17. Stakeholder Engagement Plan

The Stakeholder Engagement Plan is a fundamental component of this project's commitment to adhere to the policies and guidelines of the AfDB. It is designed to foster open communication, transparency, and collaboration with all relevant stakeholders. The contractor will develop a plan which will be structured to align with the following AfDB policy principles:

Identification of Stakeholders: The contractor will identify and classify all project stakeholders in accordance with AfDB's guidelines, encompassing local communities, government authorities, environmental organizations, and any other entities with a vested interest in the project.

Mapping Stakeholder Interests: In line with AfDB recommendations, the contractor will meticulously assess and map the interests, concerns, and expectations of each stakeholder group. This process will ensure that stakeholder needs are integrated into project planning and implementation.

Communication Strategy: The plan will adopt a robust and transparent communication strategy consistent with AfDB policies. It will facilitate information sharing through mechanisms such as regular updates, public meetings, and feedback channels.

Grievance Mechanism: As per AfDB standards, the contractor will establish an effective grievance redress mechanism that aligns with AfDB's requirements. This mechanism will enable stakeholders to report concerns, complaints, or issues related to the project, with a commitment to providing timely responses and grievance resolution.

Community Participation: AfDB's emphasis on community engagement will guide our approach, ensuring that local communities are actively involved in project decision-making processes. Their feedback and concerns will be actively sought and addressed throughout the project's lifecycle.

Cultural Sensitivity: The plan will incorporate AfDB's recommendations for cultural sensitivity, ensuring that local customs and traditions are respected and factored into project activities.

Environmental and Social Responsibility: The Stakeholder Engagement Plan will underscore the project's commitment to upholding AfDB's high environmental and social responsibility standards. The plan will actively address concerns and mitigate impacts on local communities, aligning with AfDB guidelines.

Regular Reporting: Consistent with AfDB's expectations, the contractor will provide periodic reports on stakeholder engagement activities, feedback received, and measures taken to address concerns. These reports will be shared with relevant authorities and the public to ensure transparency and accountability.

7.4. Roles and Responsibilities

7.4.1. Project Client: PIU/Road Authority

The Client will provide oversight functions of the entire project ensuring that both the Consultant and the Contractor are performing within their contractual obligations and in accordance with national and international standards and best practices. The Client also plays a liaison role between the project entities, project financiers and Government of Malawi.

7.4.2. Resident Engineer (Consultant)

The Project Engineer or Consultant has the supervision responsibility of CESMP's implementation by the Contractor during the construction phase of the Project. This includes but not limited to the following responsibilities:

- Ensuring that the consultant has 2 (two) safeguards personnel (Environmental and Social experts) who will be responsible for reviewing and supervising implementation of CESMP;
- Ensuring that the CESMP is fully implemented and maintained, including all requirements for management review and approval, auditing of effectiveness, induction and training, record keeping and reporting;
- Ensuring compliance with all relevant national legislation, as well as with the environmental controls and mitigation measures contained in this CESMP;
- Ensuring that the designs and plans follow national requirements and are aligned with international best practice;
- Overseeing the Contractor's performance with respect to ESHS management during implementation of the CESMP;
- Monitoring the overall performance of Contractor and Sub-contractors who will provide workforce, supplies and services; and
- Acting as point of contact for consultation and feedback to the Client, stakeholders and general public.

7.4.3. Consultant ESHS Personnel (Environmental and Social Specialists)

The Environmental and Social Specialists will be responsible for issuing instructions to the Contractor and where ESHS considerations call for action to be taken. The Supervising Consultant will be responsible for the monitoring, reviewing and verifying of compliance with the CESMP and Project ESIA conditions. The Consultant shall submit regular written reports to PIU/RA on a monthly basis and the Engineer's duties in this regard will include, inter alia, the following:

- Confirming that the Certificate of Approval and all permits required (ESIA Certificate, permits for establishment of borrow pits, water abstraction and damming rights, dumpsites, quarries, crusher and asphalt plants, etc) in terms of the applicable legislation have been obtained prior to commencing of project activities;
- Monitoring and verifying that the CESMP and Contract Conditions are adhered to at all times and taking action if specifications are not followed;

- Monitoring and verifying that ESHS impacts are prevented or kept to a minimum.
- Reviewing and approving method statements, in order to ensure that the ESHS specifications contained within this CESMP, Project ESIA and the Contract are adhered to;
- Inspecting the site and surrounding areas on a regular basis with regards to compliance with the CESMP, Project ESIA and Contract.
- Monitoring the undertaking by the Contractor of EHSS awareness training for all new personnel on site during construction and for maintenance activities;
- Ensuring that activities on site comply with all relevant ESHS legislation;
- Ordering the removal of, person(s) and/or equipment that does not complying with the specifications of the CESMP, Project ESIA and Contract;
- Undertaking a continual internal review of the CESMP and submitting any changes to RA and/or institution in charge of environmental protection (Environmental Authority) and the concerned Lead Agencies (in case of major changes) for review and approval;
- Checking the register of ESHS complaints maintained and ensuring that the correct actions are/were taken in response to these complaints;
- Checking that the required actions are/were undertaken to mitigate the ESHS impacts resulting from non-compliance during implementation of the project works;
- Reporting all incidences of ESHS non-compliance to the Management of RA.
- Conducting monthly ESHS performance audits in respect of the activities undertaken relating to the project;
- Keeping a photographic record of progress on site during construction from an ESHS management perspective;
- Recommending additional ESHS risk protection measures should it be necessary to do so;
- Providing feedback on any ESHS risk issues at site meetings;
- Compiling Monthly, Quarterly and End of the Project ESHS Reports.

7.4.4. Contractor ESHS Policy and Responsibilities

As stipulated in this ESIA the contractor is responsible for the implementation of the ESMP and therefore required to develop and implement the CESMP, which aligns with the ESIA to ensure sound implementation of environmental and social management during construction. Develop the CESMP for the project Providing a safe place to work together with the maintenance and means of access and egress, providing a working environment that is safe, healthy and adequate

as regarding facilities and arrangements for welfare at work and Communicating and encouraging all our employees and contractors (including subcontractors) to adopt ESHS as proactive management methodology to reduce accidents and incidents to an absolute minimum.

During construction of Benga – Dwangwa M005 road section, the contractor is required to fulfil the commitments as set out in this CESMP and also to ensure that its subcontractors fulfil the same. This includes the following:

- Preparing the CESMP and related site plans as part of the Contractor's Project Management Plan;
- The contractor will have the responsibility of implementing the safeguard documents on site during the construction phase and control workers and subcontractors in order to take care that the stipulations of those documents are respected during implementation of daily construction works.
- Assuming full responsibility during implementation of the CESMP under the contract;
- Updating the CESMP every six months and/or as directed by the Consultant, Client and/or AfDB, as a result of any changes to the Project's projected risks, proposed corrective actions for non-conformances arising from periodic or special ESHS audits to take into account the proposed areas of improvement, and due to newly identifies project risks;
- Conducting monitoring and on-site inspections and audits to verify implementation of the CESMP and reporting findings to the Consultant;
- Communicating any ESHS issues and incidents to the Consultant 24 hours of their occurrence;
- Conducting training of the construction workers and sub-contractors to raise awareness in the fields of ESHS during implementation of this CESMP;
- Overseeing the sub-contractor's performance with respect to ESHS management during implementation of the CESMP;
- Responding to all ESHS matters raised by the Consultant, the Client, Financier and other stakeholders;
- Addressing all grievances registered by staff, communities and the general public; and
- Besides the bi-weekly construction site protocols or reports, the contractor will also prepare monthly reports including the progress on implementation of the safeguard documents. The report shall contain all the conformities and nonconformities observed

during implementation of the project works and list all ESHS relevant incidents and accidents that occur during construction and implementation of mitigation measures.

7.4.5. Roles and Responsibility for Key Contractors Staff

7.3.5.1. Project Manager

The Project Manager will have the following responsibilities

- Responsible for the overall CESMP supervision;
- Coordinating with consultants, subcontractors and suppliers;
- In accordance with the contract and the CESMP, managing environment safety of construction site, including the subcontractors' construction sites;
- Making sure that every staff knows about CESMP content and procedures;
- Ensuring resources are made available for effective compliance with the law; and
- Liaising with the Resident Team Leader to obtain approval, consents and permits from authorities as appropriate.

Authority:

Suspending works if there is a serious ESHS incidents or significant non-compliance with ESHS permits or license requirements.

7.3.5.2. Contract Manager/ Engineer

The Contract Manager will be responsible for the construction management and delivery including the following:

- Planning construction works including rehabilitation in a manner that avoids or minimizes impact to environment;
- Ensuring that construction personnel manage construction works in accordance with statutory and approval requirements;
- Ensuring that environmental management procedures and protection measures are implemented;
- Ensuring that all project personnel attend an induction prior to commencing works;
- Obtaining approval for the documents that are proof of compliance with the Reference Standard;
- Informing all parties in the Project (including Sub-contractors) of the System;

- Providing general supervision for control operations in situations of environmental emergency and communication with Fire Department or Fire Fighting Volunteers when the Contractor's safety equipment at the work site is insufficient to handle the fire;
- Ensuring that construction works in the Project complies with relevant legislation and conditions of this CESMP;
- Liaising with ESHS Team to determine appropriate ESHS management strategies and implementation of contingency measures, where necessary;
- Reviewing sub-contractor's safety plans/procedures/compliance and Monitor the performance of contractors and sub-contractors used for providing workforce, supplies and services;
- Reviewing CESMP notices and related documents ensuring that they are distributed to the relevant personnel for communication to the workforce;
- Ensuring that the safety requirements of the project are met;
- Ensuring the adoption and formulation of safe standards, practices and procedures including the development of safe operating procedures;
- Ensuring that the design and planning is in compliance with national requirements and aligned with international best practices;
- Promoting and encouraging a high degree of safety awareness among staff;
- Making sure that every staff knows about the CESMP content and procedures;
- Acting as point of contact for consultation and feedback to stakeholders and the public (stakeholder engagement); and
- Ensure the preparation and implementation of training plan for construction workers to raise awareness in the field of E&S topic and in general implementation of this CESMP.

Authority:

- Suspending works if there is ESHS incident or significant non-compliance with permits or license requirements.
- Directing the implementation of ESHS protection and prevention measures at all sites

7.3.5.3. Environmental Expert

The Environmental Officer ensures that all workers receive adequate information and proper instructions concerning environmental rules and regulations of the project. He or she also establishes environmental rules for the site and ensures the consolidated co-operation in safety issues between all parties. The Environmental Expert shall be fully responsible for the

implementation and coordination on the environmental management plan for the works. Therefore, other duties and responsibilities are the following but not limited to:

- Informing the workers about the risk present on site and the preventive and protecting measures to be adopted to mitigate them;
- Conducting Environmental meetings;
- Consulting Project Manager and assisting in coordinating environmental training activities, and conducts environmental training for new employees;
- Advising the concerned departments in planning and organizing measures necessary for the effective control of personal injuries;
- Checking and evaluating the effectiveness of the action taken or proposed to be taken to prevent personal injuries;
- Rendering advice on matters related to reporting and investigation of site accidents;
- Identifying and managing environmental risks and hazards at all relevant project sites;
- Providing leadership to motivate staff to achieve environmental standards, and comply with all development approval conditions;
- Developing, implementing and reviewing environmental management systems including the CESMP for the Project;
- Undertaking regular site inspections and audits for compliance with the CESMP and development approval conditions;
- Drilling staff in site specific environmental procedures and best practices through inductions, toolbox talks and formal and informal trainings;
- Working with and providing guidance to all subcontractors and third-party entities engaged by the project;
- Undertaking awareness and sensitization campaigns on critical issues affecting the project and its stakeholders;
- Accessing competent advice including policy direction on environmental matters;
- Engaging with local leaders and communities on any issues concerning the community and the project;
- Liaising with key public sector institutions in execution of their mandates on environmental matters;
- Acting as a project relations anchor for the project on all environmental matters affecting the community and stakeholders;

- Advising the Site Manager and other engineering sections on best practices on environment;
- Monitoring Contractors compliance to environmental rules and regulations;
- Reporting and managing any environmental related accidents and other emergencies; and
- Submitting monthly reports to the Consulting Engineer and Road Authority regarding status of environment on the project site.

Authority:

- Reporting gross violation and request for suspension of works if necessary; and
- Directing the implementation of environmental protection measures at all sites.

7.3.5.4. Social Expert

The Social Officer is responsible for ensuring that all workers receive adequate information and proper instructions concerning social rules and regulations of the project. He/she establishes social rules for the site and ensures the consolidated co-operation in safety issues between all parties. The social safeguards specialist shall be fully responsible for the implementation and coordination of the social management plan for the works. The following are some of the duties and responsibilities of the Social expert:

- Ensuring that all personnel work within the guidelines of the appropriate social safeguards rules and regulations;
- Monitoring all areas for social violations and hazards, and reports infractions to Project Manager for corrective actions;
- Reports overall status of project social and issues to Project Manager;
- Maintains close liaison with the Project stakeholders to cultivate a mutual understanding of the project implementation processes and activities;
- Identifying and managing social risks;
- Providing leadership to motivate staff to achieve social standards, and comply with all development approval conditions;
- Developing, implementing and reviewing social management systems including the CESMP for the Project;
- Dealing with all matters of land including land expropriation, grievance redress, land restoration and return of temporary acquired land to appropriate authorities;
- Undertaking regular site inspections for compliance with the CESMP and development approval conditions;

- Dealing with matters of gender, labour and social welfare including gender based violence, sexual harassment and exploitation, discrimination at work place, child labour, forced labour, labour influx etc;
- Undertaking awareness and sensitization campaigns on critical issues affecting the project and its stakeholders;
- Acting as a project relations anchor for the project on all social and other matters affecting the community and stakeholders;
- Working with and providing guidance to all subcontractors and third-party entities engaged by the project;
- Training staff and community in specific social procedures and a variety of other subjects;
- Accessing competent advice including policy direction on social matters;
- Engaging with local leaders and communities on any issues concerning the community and the Project;
- Advising the Site Manager on best social practices;
- Reporting to management any social issues arising from the community and within the project;
- Receiving, recording, managing and facilitating timely redress of any project related grievances from the community, the project and the general public; and
- Submitting monthly reports to the Consulting Engineer and Road Authority regarding social status of the project.

Authority:

- Reporting gross violation and request for suspension of works if necessary; and
- Directing the implementation of environmental protection measures at all sites.

7.3.5.5. Health and Safety Expert

The Health and Safety expert ensures that all employees receive adequate information, training and proper instructions relating to health and safety rules and regulations of the project and establishes health and safety rules for the site, consolidates co-operation in safety issues between all parties. The officer establishes housekeeping regulations, is aware of all actions performed, hazardous situations at site, and carries out discipline actions whenever there are deviations from agreed safe work practices. Thus, apart from implementation and coordination of the health and safety management for the project, the Health and Safety expert also:

- Conducts health and safety induction and toolbox talk meetings;

- Consults the Project Manager and Environmental and Social Specialists (For the consultant) and assists in coordinating health and safety training activities including training for all new employees;
- Ensures that all personnel are working within the guidelines of the appropriate health and safety rules and regulations;
- Reviews and evaluates health and safety and incidents/accidents reports;
- Monitors all areas for health and safety violations, hazards and reports his or her observations and noncompliance to the Project Manager for corrective actions;
- Maintains emergency preparedness and response mechanism and assists in rescue and evacuation drills;
- Processes accident statistics and monthly health and safety reports;
- Implements accident and near misses reporting and investigation system;
- Assesses risks for critical activities;
- Ensures the availability and regular use of personal protective equipment (PPEs) in the workplaces;
- Completes the weekly site inspection forms and review with Project Manager;
- Performs daily audits to ensure that there is compliance to Client health and safety requirements;
- Reports overall status of project safety and environmental issues to Project Manager;
- Ensure immediate notification of serious injuries and fatalities to the project manager
- Assists Project Manager /environmental and social officer in occupational and environmental incidents/accidents investigations, maintains occupational incidents/accidents, environmental incidents/accidents logs and ensures that all pertinent information was recorded;
- Maintains close liaison with the feeder road project's health and safety team.
- Immediately notifies the Project Manager of any health and safety risks or non-compliance, including any serious injury (whether project related or not) to the Manager (within 24 hours).

7.3.5.6. Sub-Contractor

All subcontractors engaged by the contractor will be required to operate within the requirements of this CESMP. In some circumstances, based on the activities to be conducted by the subcontractor, the Project Manager may determine that the subcontractor be required to develop a project -specific Subcontractor Environmental Management Plan that addresses specific impacts

of the works awarded to them and may have to be approved by management before works can commence. Such plans must assess the level of ESHS risk and implement appropriate management controls for the subcontractor's full scope of work to a standard that is consistent with this CESMP. Regardless of the approach taken to manage the subcontractor's ESHS impacts, all subcontractors will be subject to the following:

- Regular on-site auditing to assess their performance against the requirements of this CESMP;
- Completion of the appropriate training requirements as specified in the training programme; and
- Implementation, protection and maintenance of ESHS management controls as set out in the CESMP and related documents.
- Obeying and observing national, Contractor's and the Project ESHS policy and safe work procedures;
- Providing personal protective equipment (PPE) to their workers;
- Identifying all high risk construction work associated with their activities and ensuring that safe work method statements are developed and implemented for the work;
- Complying with this CESMP and any direction given to them by the contractor;
- Undertaking site-specific induction before starting work and signing for the completed induction;
- Ensuring that all workers have correct tools and equipment and that these are always in good conditions;
- Ensuring that every staff has signed the ESHS Code of Conduct including expatriate and temporary workers; and
- Participating in site ESHS meetings and inspections;

Authority of Subcontractors:

- Suspending their works if there is a serious ESHS incident or significant non-compliance with permits or license requirements and implement corrective measures.

7.4.6. Nkhotakota District Council

The Nkhotakota District Council will be responsible for:

- Linking the Contractor to local communities;

- Mobilizing local communities in favour of the project implementation by communicating any intervention required from them; and
- Ensuring the implementation of project by making sure the contractors and subcontractors comply with laws, related ESHS requirements and programmes relating to protection, conservation and promotion of the environment.

7.4.7. .Nkhotakota District Communities

Communities are responsible for:

- Participating in the project implementation as local skilled, semi-skilled and non-skilled workers;
- Adherence to the guideline of the contractor for safe implementation of the project;
- Communicating and reporting the concerns to be cared by contractor;
- Participating in the public consultation and training as required for smooth implementation of the project; and
- Participating in the grievance redress committees as required to address their complaints and concerns on the project.

7.4.8. Gender-based Violence (GBV) and Harassment (GBVH), Sexual Exploitation and Abuse (SEA), and Child Protection Service Providers

These service providers are crucial for achieving of ESHS objectives and targets in the project. The PIU/RA will engage a service provider who have the expertise required to implement, monitor and report issues of GBVH and Violence against Child (VAC), SEA and child labour. The main responsibilities of the service providers include but not limited to the following:

- Providing GBVH, VAC, SEA, and child labour training to the members of Project Compliance Team (PCT). All Contractor's employees will be required to attend trainings and awareness on these social issues at least once a month.
- Preparation of a GBV, SH, VAC, SEA, and child labour action plans and monitoring of their implementation. The action plans will clearly indicate the types and frequency of awareness campaigns and trainings to be conducted and the period they will be done;
- Conducting GBV, SH, VAC, SEA, and child labour mobilization and awareness campaigns for community members and immediately reporting any issues and/or cases related to these social aspects.

- Monitoring and preparing monthly and quarterly progress reports on the implementation of GBV, SH, VAC, SEA, and child labour action plans in the project. The services provider will submit their reports to Roads Authority who will share them with the Consultant and Contractor for their information and action where applicable.
- Signing and adhering to the Project's Code of Conduct.

7.5. ESHS Awareness and Training

7.5.1. Overview

To achieve environmental, social, health and safety risk management approach described in previous sections, it is implicit that all construction personnel receive the required training. The Contractor and subcontractors will ensure that all personnel are aware of their sound environmental, social, health and safety management responsibilities. Training will not be undertaken as a one-off thing but there will be continuous refresher trainings as part of an on-going site training programme focussed on the training needs of construction personnel. Training will be provided for all new recruits and continual refresher courses will be established for staff to attend on a quarterly basis. ESHS training programmes will cover measurement techniques in the field, tools for the prediction of pollutants, reforestation methods and procedures, conservation of water bodies, safety precautions, health and social aspects, etc. The training will help all site personnel to fully understand the following issues:

- ESHS training requirements of the Project and how they will be implemented and monitored on site;
- The potential impacts of the Project, the enhancement and mitigation measures that have been adopted to address those impacts and how and where to apply these measures;
- Any environmentally and socially sensitive areas in the vicinity of the construction site;
- The procedures for responding to the unauthorised visitors to the site and enquiries from the public;
- Any defined seasonal ecological sensitivities and restrictions (timing or methods) for construction activities;
- Know how to deal with unforeseen ESHS incidents; and
- Understand the roles of Contractor's staff with respect to ESHS issues.

In addition to Contractor's site induction, Health and Safety Expert is obliged to conduct safety meetings / toolbox talks on relevant health and safety topics for all employees on a weekly basis.

Details of all safety meetings/toolbox talks, including topics and attendees must be submitted to the Construction Project Manager.

7.5.2. Site Induction Training

In order to ensure that the ESMP is effectively implemented, the Contractor will provide EHSS induction training to all its employees and subcontractor personnel working in the Project before the main project works start and whenever it is required to do so as the project progresses. This ESHS training will have to cover key ESHS issues as provided for in this CESMP, local environmental regulations compliance, and EHSS incident emergency preparedness and response procedures, and site ESHS controls. The inductions are compulsory to all personnel relevant to the project and will be held during mobilization for all recently hired employees. The goal of the induction training for personnel (including sub-contractors) is to understand the ESMP, the Contract and applicable ESHS national and international laws, regulations and best practices. The Contractor shall regularly collate and collect training information and keep records of the training sessions. After completing the induction training, refresher trainings may be needed, and the contractor shall plan accordingly. It is in the responsibility of the Contractor to prepare a detailed training plan and an indicative induction training plan which will include items as presented in *Table 60*.

Table 60: Indicative Induction Training Plan for the Project

Item No.	Induction Training Topic	Target Audience	Repetition of the topics (during the assignment)	Training Responsibility	Training Place
1	Enhancement and mitigation measures included in the ESMP and how it will be implemented on site including responsibilities	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	To be identified (TBI)
2	Sensitivity of the area (if any) in which the Project will be constructed.	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI

Item No.	Induction Training Topic	Target Audience	Repetition of the topics (during the assignment)	Training Responsibility	Training Place
3	Public/Occupational Health and Safety (H&S) rules at the construction site (e.g. personal protective equipment, rules of conduct, first aid).	All employees and all temporary visitors	A toolbox talk at the start of the daily work assignment and on a weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI
4	The Project's Grievance Mechanism and the basic worker's rights.	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI
5	How to deal with enquiries/ questions/ grievances by the public/ local stakeholders.	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI
6	Interaction rules with the people living close to the construction site (Code of Conduct) and how to deal with unauthorized visitors to the site.	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI
7	How to deal with unforeseen incidents/ emergency situations.	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI
8	The roles and responsibilities within the Contractors, Sub-Contractors and workers with respect to managing ESHS issues	All employees	Weekly basis and during the construction activities.	Contractor/ PIU/Consultant ESHS Experts	TBI

Item No.	Induction Training Topic	Target Audience	Repetition of the topics (during the assignment)	Training Responsibility	Training Place
9	Record keeping of the ESHS training sessions.	All employees	Weekly basis and during the construction activities.	Contractor/PIU/Consultant ESHS Experts	TBI

7.5.3. Specialist ESHS Training

Effective implementation of the ESMP will largely depend on the knowledge and skill of various project implementers and participants. There are many areas of required training and awareness depending on institutional or individual needs in relation to the tasks assigned to those particular persons. Consequently, in addition to the site induction training, specific ESHS training will be provided that will target small, discrete groups of employees who carry out the same, or similar, roles such as the Contractor's supervisors.

Since the ESMP covers ESHS aspects of the project, the special ESHS training will be in form of: briefings, sensitizations, and orientations. These types of trainings will be delivered by key ESHS Experts, relevant heads of sections, external experts, and some delegated persons and authorities. Top management will show commitment by inaugurating or participating in all-important training. Specialist ESHS training will also be provided for construction workers as applicable to their job responsibilities. For example, selected workers will be responsible for emergency preparedness and response such as oil and chemical spills.

The Contractor and subcontractors will maintain a training needs matrix and associated training programme to identify which specific job roles for their respective organizations require such additional specialist training. Specialist training will either be performed by suitable qualified in-house personnel or by approved specialist external training providers.

In addition, any temporary visitors accessing the site will be accompanied by staff who received ESHS training. All the training sessions will be recorded in Training Form or Log and will be maintained on-site. The date of the sessions, name of attendees (segregated by sex) and name of

the trainer, summary of training activity and photos will be recorded. The contractor shall regularly review and update the training and awareness plan based on changes in training needs related to ESHS management system and regulatory requirements. *Table 61* shows the EHSS Training Framework.

Table 61: Training and Orientation Framework

Nature of Sessions	Timing	Target groups	Facilitators	Training Pla
Project Sensitizations and Briefings	Before Start of the Project	<ul style="list-style-type: none"> • Host Community • Local Leadership • Nkhotakota District Council\ • Civil Society • GRM committees 	Client, Consultant and Contractor Representatives	Around the project site
Code of Conduct Inductions and Management Briefings, management Meetings	<ul style="list-style-type: none"> • At the start of the Project • Introduction of any new personnel to the site • Introduction of visitors to the site • Engagement of Sub-contractors & any outsourced service providers 	<ul style="list-style-type: none"> • Project Staff • Visitors • New Recruits • Sub-contractors • Outsourced Service providers 	<ul style="list-style-type: none"> • Environmental and Social Specialists and service providers • Section Heads and Supervisors • Management 	• TBI
Formal Staff Trainings, Refresher Courses, Toolbox Talks, Drills, Demonstrations, On the job training, Briefing sessions, Workshops, Audio-visual events, Role-play, Meetings, Focus Group Discussion Participatory investigations, and	<ul style="list-style-type: none"> • At the start of & during the construction phase of the project. • At the onset of new activities or components • After accidents and incidents • During Emergencies and High-Risk Operations • After Audits & Reviews 	<ul style="list-style-type: none"> • Project Staff • Visitors • New Recruits • Sub-contractors • Outsourced Service providers • Heads of Sections and Supervisors 	<ul style="list-style-type: none"> • Environmental and Social Specialists • Section Heads and Supervisors • Management • External Experts and Authorities • Independent Consultants 	• TBI

Nature of Sessions	Timing	Target groups	Facilitators	Training Plan
reviews, Disciplinary actions and events, etc.			<ul style="list-style-type: none"> • GRM committee 	
Community Briefings and Sensitizations, Community Trainings, Community Meetings, Drills, Role-plays, Demonstrations, Counselling events, etc.	<ul style="list-style-type: none"> • At the start of & during the construction phase of the project. • At the onset of new activities or components • After accidents and incidents • During Emergencies and High-Risk Operations • After Audits and Reviews 	<ul style="list-style-type: none"> • Community members and leadership • Special Communities Groups e.g. Women • Local Institutions and interest groups • Civil Society • GRCs 	<ul style="list-style-type: none"> • Environmental and Social Specialists • Project Spokes Persons • External Experts and Authorities • Independent Consultants • Client and Consultant Representatives 	<ul style="list-style-type: none"> • TBI
Public Orientation and Briefing Sessions.	On Daily Basis during Construction Phase of the Project	<ul style="list-style-type: none"> • General Public • Travelers • Traffic Operators • Visitors 	<ul style="list-style-type: none"> • ESHS Staff • Security Personnel 	<ul style="list-style-type: none"> • At the project site
External needs-specific skill Training, Meetings, Workshops, and Orientations.	During the construction phase	<ul style="list-style-type: none"> • Selected Staff • Community individuals & groups 	<ul style="list-style-type: none"> • ESHS Staff • Management • External Trainers 	<ul style="list-style-type: none"> • Project Site
Signage, Audio-Visual Materials, Posters, and Other Inscriptions	During the construction phase	<ul style="list-style-type: none"> • Everyone 	<ul style="list-style-type: none"> • ESHS Staff • Management 	<ul style="list-style-type: none"> • TBI

7.5.4. Toolbox Talks

Toolbox talks shall be conducted once the project is underway on a daily or weekly basis to reinforce the focus on ESHS. Toolbox talks, sometimes referred to as tailgate meetings or ESHS briefings, are short, informal safety meetings held at the start of each day or shift. Providing toolbox is the responsibility of the Contractor's ESHS Experts to implement a programme of

toolbox talks for all construction personnel during the construction phase. The toolbox talks will be specifically tailored to address different ESHS risks and may require full attendance of all the management staff from the contractor, subcontractor and supplier. The daily pre-start meetings will include all ESHS components so that workers are aware of the right practices for implementing ESMP, and procedures for any emergency situations and their responsibilities.

Toolbox talks are a great way to reinforce ESHS basics, focus on high-risk scenarios and to inform workers about changes to the jobsite and working conditions that may have occurred since their last day/shift. This also involves discussing any accidents or injuries that have occurred and how they could have been prevented. The following are keys to a successful toolbox talk:

- Keeping it short. Toolbox talks should be around 5 – 20 minutes.
- Focusing on one topic relevant to the work being done that day.
- Getting workers involved by asking questions or having them demonstrate safe work practices.
- Being sure to cover changes to the site or working conditions.
- Having employees inspect tools, equipment, and PPE. Giving room for questions and answers at the end of the toolbox talk.

Contractor or Consultant's senior management may call for additional toolbox talks should the need arise to further discuss and address ESHS aspects. Topics to be covered during the toolbox talks will include but not be limited to the areas highlighted in *Table 62*.

Table 62: Topics to be covered in Toolbox Talks

Item No	Toolbox talks	Target Audience	Period	Time Toolbox talks covered	Training Responsibility	Training Place
1	Occupational Health and Safety topics	all workers	nightly toolbox talks	less than fifteen minutes	Contractor's Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the worksite
2	Gender Based Violence(GBV), Violence against Children(VAC),	all workers	nightly toolbox talks	less than fifteen minutes	Contractor's Environmental, and safety Officer(s) and	At the worksite

Item No	Toolbox talks	Target Audience	Period	Time Toolbox talks covered	Training Responsibility	Training Place
	and Sex Exploitation Abuse(SEA)				PIU/Consultant ESHS Specialists necessary	
3	Minimising vegetation clearance;	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant EHS Specialists i necessary	At the wo site
4	Code of Conduct	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the wo site
5	Water quality, air and sound quality and erosion control;	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the wo site
6	Toolbox talks regarding COVID 19 Pandemic, general awareness and how to reduce chances of being infected or	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the wo site

Item No	Toolbox talks	Target Audience	Period	Time Toolbox talks covered	Training Responsibility	Training Place
	spreading COVID 19 by taking preventive precautions.					
7	Toolbox talks regarding on the way of protecting trees that are within the project foot print	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the work site
8	Noisy works or works outside of normal operating hours;	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the work site
9	Toolbox talks regarding on Road safety	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the work site
10	Environmental, social and safety procedures covered within the ESMP sub-plans`;	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant	At the work site

Item No	Toolbox talks	Target Audience	Period	Time Toolbox talks covered	Training Responsibility	Training Place
					ESHS Specialists necessary	
11	HIV/AIDS and Sexual transmission diseases	all workers and communities	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the project site
12	Toolbox talks on PPEs use	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the work site
13	Noncompliance procedures; and Any changes to the CESMP.	all workers	nightly toolbox talks	less than fifteen minutes	Contractor`s Environmental, and safety Officer(s) and PIU/Consultant ESHS Specialists necessary	At the work site

7.5.5. Awareness and Training Records

Records of all awareness and training in the form of minutes of meetings, the list of attendees, and photos should be maintained in line with the requirements of CESMP and Project ESIA. Staff will complete and sign an attendance sheet for all awareness sessions, training courses and toolbox talks. Staff will also be asked to complete a course evaluation sheet at the end of each training course in order to assess the effectiveness of the training delivered.

All records, including the course evaluation sheets and attendance sheets for training and awareness raising events, will be held in a central location by the Contractor`s ESHS Experts and made available during any audit by the Consultant, Client, Bank and their representatives.

7.5. ESHS Audit and Inspection

In addition to the routine monitoring detailed above, a schedule of regular inspections, audits and reporting will be required by the Contractor. These inspections and audits will provide a record of site conditions and activities and provide a mechanism by which the Contractor will establish the effectiveness of the CESMP. These checklists and reports will be kept at each site office and will be updated and used in the day to day activities of the site. The Consultant and PIU/RA will also develop a schedule of inspections and auditing of the Contractor project activities to ascertain the Contractor`s adherence to the CESMP, Contract, and Project ESIA.

The periodic audits and/or inspections will address all ESHS issues including dust, litter, noise, traffic, surface water, waste management, grievances, incidents and general housekeeping, and an Audit/Inspection Report will be developed and shared amongst the Project Implementation Team. The frequency of these audits (weekly /monthly/quarterly) will be based on the nature of Contractor activity.

Table 63: Indicative ESHS Audit/Inspection Parameters

Item No.	ESHs Auditing/Inspection parameters	Responsible Auditing Authority		
		Daily	Periodically	(Weekly/Monthly/Quarterly)
1	Dust management.	Contractor ESHS Experts	Supervision Consultant	PIU/RA, Consultant, and District Council.
2	Liquid and solid wastes management			
3	Sewage waste (waste waters from toilets).			
4	Road Signs.			
5	Level of air pollutants e.g. dust and emissions from mobile machinery.			
6	Noise level.			

Item No.	ESHS Auditing/Inspection parameters	Responsible Auditing Authority		
		Daily	Periodically	(Weekly/Monthly/Quarterly)
7	Water quality (DO, Ca, Mg, TSS, Turbidity, Coli form Count).			
8	Soil pollution			
9	Trees clearing along the road, tree replanting and number / area of planted trees.			
10	Emergency in case of accident accidents prevention: target is zero injuries, zero incidents, and zero damage to environment.			
11	Encroachment of construction activities onto the park and wetlands.			
12	Training, consultation and awareness creation workshop.			
13	Signboard, warning tapes and guard rails present on sites.			
14	Training reports, number of trained staff.			
15	Number of PPEs onsite.			
16	Lists of PAPs & their affected assets, Lists of paid PAP.			

7.6. Compliances and Non Compliances

7.6.1 Non-Conformance, Corrective and Preventative Action

Overview

This section provides the appropriate actions in the event of a reported ESHS policy and standards requirement noncompliance during the construction phase of the project. Non-compliance can be reported via the daily site walkover, the weekly site inspection or by construction personnel

upon discovery. In addition to non-compliances, which may result in construction works being suspended there are likely to be small ESHS issues that may need to be addressed on a daily basis. These are addressed as minor non-compliances via the use of the ESHS non-compliance register.

A minor noncompliance is defined as:

- A non-compliance that can be resolved within a short timescale; and
- Would not result in either environmental harm or an emergency situation.

A non-compliance that requires the non-compliance procedure and/or request corrective actions to be followed is defined as:

- Deviation from the Contractor ESHS policy or its underlying objectives and targets;
- Deviation from the requirements of the CESMP and sub-plans/procedures; and
- A regulatory non-compliance which could result in environmental harm and/or an emergency situation as a result of construction activities.

The Corrective Action Requests (CARs) will be issued to ensure that prompt action is agreed and committed to, with a view of effective resolution of any non-conformance and any deviations from the CESMP requirements or any serious ESHS issues. This corrective CARs may be raised as a result of:

- An internal or external communication;
- An internal audit;
- A regulatory audit or inspection;
- A suggestion for improvement;
- An incident or potential incident.

7.6.2. Compliance, Non-conformance and Corrective Action Report (CAR)

If criteria within the CESMP are not fulfilled and appropriate and corrective action is not taken a non-conformance may be raised by the project ESHS Experts. Examples of circumstances where this may arise include:

- Receipt of a complaint regarding pollution or other ESHS impacts caused by the project;
- Departure from approved or agreed procedures; and
- Non-conformance identified as a consequence of any self-assessment, formal audit or other ESHS survey or inspection.

Corrective action may include changes to work instructions (frequency of testing, test method etc.), alterations to the CESMP, further staff training etc. Non-conformances should be reviewed by the ESHS Experts and form part of construction meeting agenda.

In addition, non-conformance/corrective action report can be issued to the Contractor by the Consultant and/or Client. It is the responsibility of the Contractor to immediately initiate corrective actions and, once completed, provide details of the actions undertaken through a non-conformance/corrective action report and return it signed to the Consultant and/or Client's Resident Team Leader and Project/ESHs Experts within an agreed timeframe. If the non-conformance is considered to breach legislative requirements, the breach should be reported to the appropriate public authority.

7.6.3. Non-Compliance Procedure

In the event that a serious ESHS non-compliance is identified in either the daily site walkover or the weekly site inspection or as a result of a complaint, all construction work connected to the non-compliance will be suspended. The ESHS Experts will conduct an investigation into the issue and if the non-compliance is confirmed to be as a result of the construction activities and could cause ESHS harm and/or an emergency, work may not recommence until the relevant control measures are implemented appropriately or adapted.

Further, specific details of the investigations are provided within each of the ESHS sub plans (Management Strategies and Implementation plans). However, if deficiencies are identified and non-compliances with the ESHS policy, standards and plans requirements and objectives of this plan are observed, an Incident Report will be completed as described below.

7.6.4. Incident Report

Any breaches of the management procedures identified in any of the sub-plans or Management Strategies and Implementation plans (MSIPs) as indicated in the ESMP and standalone MSIPs should be reported to the Contractors ESHS Expert, using an incident report form.

As part of the incident report, any additional relevant actions/mitigations that could help to prevent reoccurrence of the ESHS incident will be discussed amongst Contractor's Project Manager and ESHS Expert. Once they have been agreed and recorded in the incident report form it will

be the responsibility of the ESHS Experts to update the relevant control procedures within the appropriate sub plans. A copy of each completed incident report will be held on file by the Contractor's ESHS Experts and included in the weekly, monthly, quarterly and project closure report.

For serious incidents, including serious injury and fatality the report will be submitted to the Consultant, PIU/RA and the AfDB within a maximum of 24 hours.

7.7. Communication and Reporting

This section outlines the communication, reporting and notification processes associated with implementation of the CESMP during the construction phase. The Contractor, Consultant and PIU/RA will closely work together to identify and agree all Project communication, notification, and reporting requirements.

7.7.1 Keeping of Records

The Contractor will ensure that records of all ESHS incidents/events that are likely to cause non-compliance and/or harm to the environment and or human life are maintained at the project site and this will include ESHS Incidents/Near Miss Reports, Materials Safety Data Sheets (MSDS) for all chemical used at the project sites, Audit/Inspection Reports, Land Acquisition/Tenancy Agreement/Consent Forms, Compensation Documents, Signed Training and Toolbox Records, Task Risk Assessments, Grievance Registers, licenses and permits and all correspondences with the Consultant, Client, and relevant Government Departments and other Stakeholders.

7.7.2. Reporting

Progress of ESMP implementation, including any problems detected during the audits and inspections, will be recorded and reported to the Project Manager, Consultant and Client through weekly and monthly ESHS Progress Reports.

7.7.3. Monitoring Data

Data collated from monitoring activities will be stored in a document management system for the Project.

7.7.4. ESHS Monthly Progress Reports

Progress Reports should be prepared which will summarize the results of all ESHS monitoring activities. The reports will give monitoring data in a standard format. Reports will emphasize any significant violations of Contract provisions by the Contractor or any failure to implement requirements of the ESMP, and Project Contract and ESIA. Any

significant incidents of ESHS violations will be summarized along with actions taken to mitigate these and to prevent reoccurrence. Progress Reports will be submitted to the Consultant and PIU/RA and other relevant institutions during construction. In the ESHS Monthly Progress Report, the following will be included:

- Status of implementation of relevant ESHS mitigation measures pertaining to the works.
- Interactions with regulators: identify agency, dates, subjects, outcomes (report the negative if none);
- Key ESHS problems encountered and actions taken to rectify them.
- Summary of ESHS complaints received and actions taken.
- Status of all permits and agreements:
 - work permits: number required, number received, actions taken for those not received;
 - Status of permits and consents:
 - Statuses of permits and licences from regulatory authorities
- List areas/facilities with permits required (quarries, asphalt and batch plants), dates of application, dates issued (actions to follow up if not issued), dates submitted to resident engineer (or equivalent), status of area (waiting for permits, working, abandoned without reclamation, decommissioning plan being implemented, etc.);
- List of areas with landowner agreements required (borrow and spoil areas, campsites), dates of agreements, dates submitted to resident engineer (or equivalent);
- Major activities undertaken in each area in the reporting period and highlights of environmental and social protection (land clearing, boundary marking, topsoil salvage, traffic management, decommissioning planning, commissioning implementation);
- For quarries: status of relocation and compensation (completed, or details of activities and current status in the reporting period).
- Summary of non-compliance notifications issued to the Contractor during the month.
- Key ESHS issues to be addressed in the coming month.
- Health and safety supervision:

- Full inspections & partial inspections, reports to construction/project management;
- Number of workers, work hours, metric of PPE use (percentage of workers with full personal protection equipment (PPE), partial, etc.), worker violations observed (by type of violation, PPE or otherwise), warnings given, repeat warnings given, follow-up actions taken (if any);
- Number of non-safety disease or illness treatments and diagnoses (no names to be provided).
- Data on waste collection: type of wastes, quantities, names of collectors and final destination and the reception at the final destination. This will also apply to wastes collected for reuse and recycling purposes.

7.8. ESIA Approval, Review and Disclosure

This ESIA is an instrument prepared by a consultant and shall be approved by the Client (RA) and AfDB. The client (RA) will also share this ESIA with relevant Government Departments and regulatory institutions such as MEPA if this is deemed necessary. The contractor will develop its CESMP and will be reviewed quarterly to incorporate all ESHS issues that were missed during the preparation phase of new risks that have been identified in the course of executing project works.

7.9. Monitoring Program costs

Table -64. Monitoring Program costs

Item	Description	Total Cost (MWK)	Total Cost (USD)	Remarks
1	<ul style="list-style-type: none"> Costs for the PIU/RA to oversee implementation and monitoring of the ESMP; Office and Capital Expenses; and Professional fees 	280,000,000.00	338,800.00	<ul style="list-style-type: none"> Lump sum
2	<ul style="list-style-type: none"> Service providers (GBV, HIV and AIDs etc) 	250,000,000.00	302,500.00	<ul style="list-style-type: none"> Lump sum
3	<ul style="list-style-type: none"> Costs for the Consultant ESHS Experts to supervise/Inspect the implementation and monitoring of the CESMP; Office and Capital Expenses; and Professional fees 	200,000,000.00	242,000.00	<ul style="list-style-type: none"> Lump sum
4	<ul style="list-style-type: none"> Hiring Consultants for independent Annual Environmental Audit 	120,000,000.00	145,200.00	<ul style="list-style-type: none"> Lump sum
Sub Total		850,000,000.00	1,028,500.00	
10% Contingency	To cater for unforeseen costs.	85,000,000.00	102,850.00	
TOTAL		935,000,000.00	1,131,955.00	

7.10. Total cost for the full implementation of Environmental and Social Management Plan

Table -65 Full implementation of Environmental and Social Management Plan

Item	Description	Total Cost (MWK)	Total Cost (USD)	Remarks
1	• Enviromental and Social Management Plan	576, 000, 000.00	484, 000.00	
2	• Environmental and Social monitoring Plan	195, 840, 000.00	1, 318, 295.00	
3	• Stakeholders Engagement Cost	110, 000, 000.00	133, 100.00	
TOTAL	•	1,599, 500, 000 .00	1, 935, 395.00	

CHAPTER EIGHT: STAKEHOLDERS ENGAGEMENT AND GRIEVANCE MECHANISM

8.1. Overview

As part of preparation of this ESIA, the consultant conducted interviews with the different stakeholders including the communities surrounding the project area. In order to ensure adequate participation of relevant stakeholders, the RA and Contractor will ensure that the local communities are informed at an early stage and before commencement of civil works. The information that will be shared will include timelines, expected impacts, communication channels and the role of the established grievance management committees that receive, communicate, manage and document all grievance procedures. If applicable, the Project Implementation Unit (PIU) will prepare a stakeholder engagement plan that will be subject to approval and clearance by the AfDB. The overall aim of the plan for the project is to involve the different project stakeholders in addressing the concerns and opinions of the stakeholders with ultimate view of ensuring that there is smooth project implementation. The contractor to be engaged will use the prepared document as guidance to meet and involve the different mentioned stakeholders in resolving site complaints raised through organizing public meetings to discuss public welfare and addressing issues regarding the project, holding workshops and organizing awareness meetings.

This section of the ESIA lead to development and cost of a Stakeholder Engagement Plan and Grievance Redress Mechanism structure and recommend how Grievances and feedback from project activities and/or ESMP implementation will be captured and addressed during preconstruction, construction and post construction, and operation and maintenance phases. It also advances sustainability initiatives during Project construction, operation and decommissioning phases. The plan and commitment will be consistent with the contractor's commitment to working hand in hand with the public, stakeholder groups and communities to fully achieve the development potential of Benga – Dwangwa M005 road section Project and eventually contribute to the sustainable development of the communities residing around the road project.

The objective of stakeholder's engagement is to:

- identify parties with an interest in the project, understand their interests and concerns, and ensure opportunities for their participation;
- build long-term and mutually-beneficial relationships;
- establish effective communication processes;
- allow for meaningful input into the project planning, design and development activities; and
- Ensure effective tracking and documentation of engagement activities and issues.

During preparation of this ESIA the consultant engaged with relevant stakeholder in Nkhonkhot District. The consultation for the project first started with a visit to Nkhonkhot District Council and met with the District Environmental Officer. It was noted during the meeting that the Council is already aware of the project.

The consultant also engaged with officials from Malawi Police Service and the community around project site through meeting with the District Grievance Redress Management Committees. The Committee members asked a number of questions to which the consultant responded as indicated in *Table 66*.

Table – 66 Questions and Responses from Stakeholder Consultations

Issue/ Question asked	How the issue/ question was/will be addressed
When shall the project commence	The project will start within less than a month after the site hand over
Shall the surrounding community be employed to work for the contractor?	The ESIA report will recommend to get more workers from within Nkhonkhot. However, other workers will also get from outside Nkhonkhot and some may come from outside the country to perform special duties on the project
Other people have constructed within the road reserve and other are doing their business within the road reserve. What will happen with them?	The project has prepared RAP which includes all issues of displacements and compensations.

Issue/ Question asked	How the issue/ question was/will be addressed
There is a legacy issue of Mota-Engil who did not compensate people along the road despite recording their names. What will this project bring and what will happen to them. Will they be compensated?	We are not aware of this but the Client (Malawi Roads Authority) and the district council is better placed to respond to this question and deal with, which will be communicated to them.
5. What will be done to ensure that accidents do not occur to road users during the construction period?	Sensitization and awareness programs. The contractor will provide road safety signs that be provided especially in places of high probability of accident occurrence.

8.2. Engagement Program during Project Construction

8.2.1. Objectives

During construction phase, the contractor will continue engaging with the public, stakeholder groups, communities, and affected/project beneficiaries. Key objectives of the on-going engagement program during this phase are:

- to ensure transparency and accountability about the contractors environmental management and social responsibility performance;
- to ensure there are continuing opportunities to discuss interests and concerns, and to resolve issues, related to the Project; and
- To work in partnership with local communities and stakeholders to have the Project contribute to the achievement of their own development goals based on their priorities and aspirations.

8.2.2. Engagement Dimensions

There will be a number of dimensions to the Contractor's engagement program as described below. The Contractor will have to modify or expand these as may be required to effectively ensure that the engagement objectives are met.

➤ *Site Committee or Field Team*

A key component of the contractor's engagement program will be a field team which will collaborate with nearby communities, local authorities, project affected persons (PAPs) and other stakeholder groups to establish and maintain good community relations throughout the project implementation phase. The purpose of the Committee is expected to:

- disseminate and discuss information about project activities;
- provide community review of ESHS (Environmental Social Health and Safety) monitoring and performance of the Project;
- Provide a forum for exchange of information and discussing lodged and or registered ESHS issues and developing effective means for addressing such issues.

➤ ***Contractor Offices***

Furthermore, during the construction phase, there will be significant interest in the on-site activities as well as business, contracting and employment opportunities. The Contractor will establish an office in the project area. This office will provide information on the Project, answer questions, and collect any comments or questions from members of the public. This office will provide the public with information about employment, procurement and contracting opportunities.

➤ ***Site Tours and Open Houses***

During Construction of the Project, the Contractor will provide guided tours (pre-arranged) and conduct open houses at key milestones to keep the public informed about the Project.

➤ ***Presentations and Meetings***

Contractor will be active in meeting and presenting the Project and updates to a number of individuals, stakeholder groups, individuals representing stakeholder groups, business groups, and district, sector officials, as required.

➤ ***E-mail and Phone Calls***

The contractor will explore the possibility of creating project email and provide phone numbers that can be used by stakeholders express their views, concerns and request information.

8.3. Grievance Redress Mechanism

It is imperative that grievances, issues or concerns that may rise from projects be in a fair and transparent manner. The Government of Malawi is committed to addressing and

resolving grievances, disputes and conflicts that may arise in the course of implementation of the projects like this one. For this reason, Government through Roads Authority with the participation of stakeholders prepared and established Grievance Redress Mechanism (GRM) to support implementation of Benga – Dwangwa project. The contractor will review the Government`s GRM and aligned the GRM component of its CESMP.

Grievance Redress Mechanism (GRM) can be defined as a set of structures, procedures and processes by which complaints, queries or clarifications about the project will be responded to and problems that arise during implementation are resolved. The aim is to provide a platform for stakeholder engagement and involvement in management of grievances. In addition, the GRM helps to improve the Project social performance.

In the proposed Benga – Dwangwa M005 road Project, GRM is designed because the project activities may change the existing balance in society. Among others, the anticipated project activities and other resettlement and compensation issues may affect property, means of livelihood, and organization of social, cultural, spiritual and spatial aspects in the project district. This might ultimately create community grievances and complaints and therefore, the project grievance redressing system should be designed in such a way that it functions in a flexible manner and resolves the raised issues without fear or favour.

In the course constructing the Benga – Dwangwa M005 road project, grievances will be actively tracked to ensure that appropriate resolution and actions are taken. A clear time schedule (not more than seven days) will be defined for resolving grievances at each stage, ensuring that they are addressed in an appropriate and timely manner. The corrective actions will be implemented if appropriate and the complainant will be informed of the outcome within the stipulated and agreed time frame. To achieve this, the proposed GRM Committees for the project will have a working place and adequate budget for implementation.

8.4. Rationale of GRM

Grievances, concerns and problems will always occur during project implementation. If such grievances, concerns and problems are not timely resolved, they can derail the

implementation of the project. The GRM establishes a way for individuals, groups, or communities affected by the project activities (collectively called project-affected people – PAPs) to contact responsible authorities if they have an enquiry, a concern, or a formal complaint. GRM helps to address PAP's concerns and complaints promptly, using an understandable and transparent process that is gender-responsive, culturally appropriate, and readily accessible to all segments of the affected persons. It provides a platform and enables systematic identification of emerging issues and trends, and facilitates corrective action. More important, a fully established GRM helps to prevent minor disagreements from developing into more serious disputes, thereby, providing a simple, speedy and cost effective mechanism of re-installing satisfaction to the ones that were affected. Grievances may arise from members of communities who are dissatisfied with (i) the eligibility criteria, (ii) community planning and resettlement measures, (iii) actual implementation, (iv) issues related to ESHS concerns and (v) Gender-Based Violence (GBV) or related social aspects. The grievance redress procedure does not replace existing national legal processes. Based on consensus, the procedures will seek to resolve issues quickly, and expedite the receipt of entitlements, without resorting to expensive and time-consuming legal actions. If the grievance procedure fails to provide a result, complainants can still seek legal redress procedure.

8.5. Building Blocks of GRMs

Throughout the construction of Benga – Dwangwa M005 road section, the project implementors will ensure that the following building blocks are manifested in the GRM:

- i. **Six Principles:** Fairness; objectiveness and independence; simplicity and accessibility; responsiveness and efficiency; speed and proportionality; and participation and social inclusion;
- ii. **People:** Informed beneficiaries on the GRM procedures and dedicated GRM personnel; continuous training and learning; and
- iii. **Analysis:** Regularly review and act upon grievances data, trends and systemic issues.

The project will keep the register of issues and concerns for the purpose of easy tracking and ensuring that every issue/concern is addressed and closed.

8.6. Characteristics of Effective GRMs

To make the Benga – Dwangwa M005 road Project`s GRM effective, the project will ensure that the following are available: multiple grievance uptake locations (e.g. Grievance Boxes) and channels for receiving grievances; clear processing guidelines (including reviewing procedures and monitoring systems); effective and timely grievance response system to inform complainants of the action taken; and fixed but flexible standards for grievance resolution.

8.7. Institutional Arrangements and Composition of GRM

The Grievance Redress System for the Benga – Dwangwa M005 road shall be established at two levels and these are Project and district levels.

8.7.1. Project/Community Level

At this level, there shall be Community Grievance Redress Management Committee (CGRMC) and Workers Grievance Redress Management Committee (WGRMC). The two committees shall be the lowest and an entry point of grievances at the community level and contractor levels. The Committees at this level shall record, vet and hear cases as submitted to them by project affected persons (PAPs). If the PAP will be satisfied with the resolution, the case will be closed. The communities within the vicinity of the project sites, Contractor and his workers shall be sensitized of the existence of these committees.

8.7.1.1. Community Grievance Redress Management Committee

The CGRMC will handle issues/concerns raised by the community. Among other the issues include:

- i. environmental issue such as dust experienced by passengers and community members residing along the road especially those located at diversions, and competition for water; 2) Social issues related to land acquisition, infrastructure/property damage, sexual harassment, child labour, security concerns, GBV, VAC etc.;
- ii. Employment for local community (village around the project area); and
- iii. Unfulfilled development commitments in communities. The CGRMC will comprise the following: Business Men Representative, Youth Representative, Women Representative, Local NGO Representative, religious representative, Community

(Village) Leader, e.g. GVH, Community Police, Social welfare, Child Protection Officer, GBV SP. Grievances that have not been resolved at this level shall be referred to the District Grievance Redress Management Committee for further deliberation.

8.7.1.2. Workers Grievance Redress Management Committee

Given that the project will use different workers for implementation of Benga – Dwangwa M005 road section project in Nkhotakota District, there is need to have a workers Grievance Redress Management Committee for addressing their complaints. The aim is to ensure that rights of all workers are respected and maximize participation, support and benefit to all Contractor's workers. Therefore, the WGRMC will be the primary reference point to any complaint, concern, injustice, wrongdoing, accusation related to the project implementation and anything that can make any of the Contractor's workers to feel unhappy with the working conditions. It will also handle queries, suggestions and comments from all workers about their current working conditions. To facilitate anonymity in reporting of issues or concerns, grievance boxes will be displayed or put at strategic locations for workers to submit their grievances.

WGRMC will comprise the following members: Finance and Administration Personnel, Human Resources Officer, Health Safety Officer, Social and Gender Officer, Environmental Specialist, Representatives of workers (1 per each section/ group of workers). The Committee will choose among themselves the persons to serve in the position of Secretary, Vice Secretary, Chairperson and Vice Chairperson. Any worker with complaints will lodge them to the members of the Committee through physical contact, grievance box or direct phone message or phone call so that the complaints are addressed by the Committee within a period of one week. The secretary will record received worker's complaint in register and this register shall also be maintained and updated by the ESHS Safeguards team for easy tracking by the Consultant and Client. The grievance boxes shall be checked on a daily basis to ensure that all the lodged grievances are identified and addressed in time. The worker will get feedback on his/her complaint from the secretary. Nkhotakota District Labour Office maybe contacted to help in resolving complaints in accordance with Malawi Labour Laws when need arises. However, before consulting Nkhotakota District Labour

Office, if the grievance is not resolved at this level, it will be referred to the District Grievance Redress Management Committee for further action and the District Labour Officer is also a member of the District-level GRM Committee.

8.7.2. District Level

8.7.2.1. District Grievance Redress Management Committee at the District (DGRMC)

This Committee will handle issues/concerns that are not concluded at the project/community level. If cases at the CGRMC and WGRMC are not closed, the grievances shall be referred to the DGRMC. The project affected person shall be informed that his/her issue was referred to the upper committee for hearing and resolution. The DGRMC shall receive and record the cases as referred to them by the CGRMC and/or WGRMC. This Committee shall hear the case from the PAP and review the decision made by CGRMC and/or WGRMC. If the PAP will be satisfied with the decision at this level, the case will be closed. Where the case was not closed at this level, the PAP shall be advised to seek justice from the Court of Law. The decision made by the Court of Law shall be final.

The DGRMC for Benga – Dwangwa M005 road Project will comprise the following: Director of Public Works, District Gender and Social Welfare Officer, District Lands Officer, District Labour Officer, NGO Representative and District Environmental Officer, Police Officer (from Victim Support Unit), RA, Magistrate, and District Health Officer.

8.8. The Grievance Redress Mechanism Structure

Figure 44 highlights the grievance redress structure for Benga – Dwangwa M005 road Project.

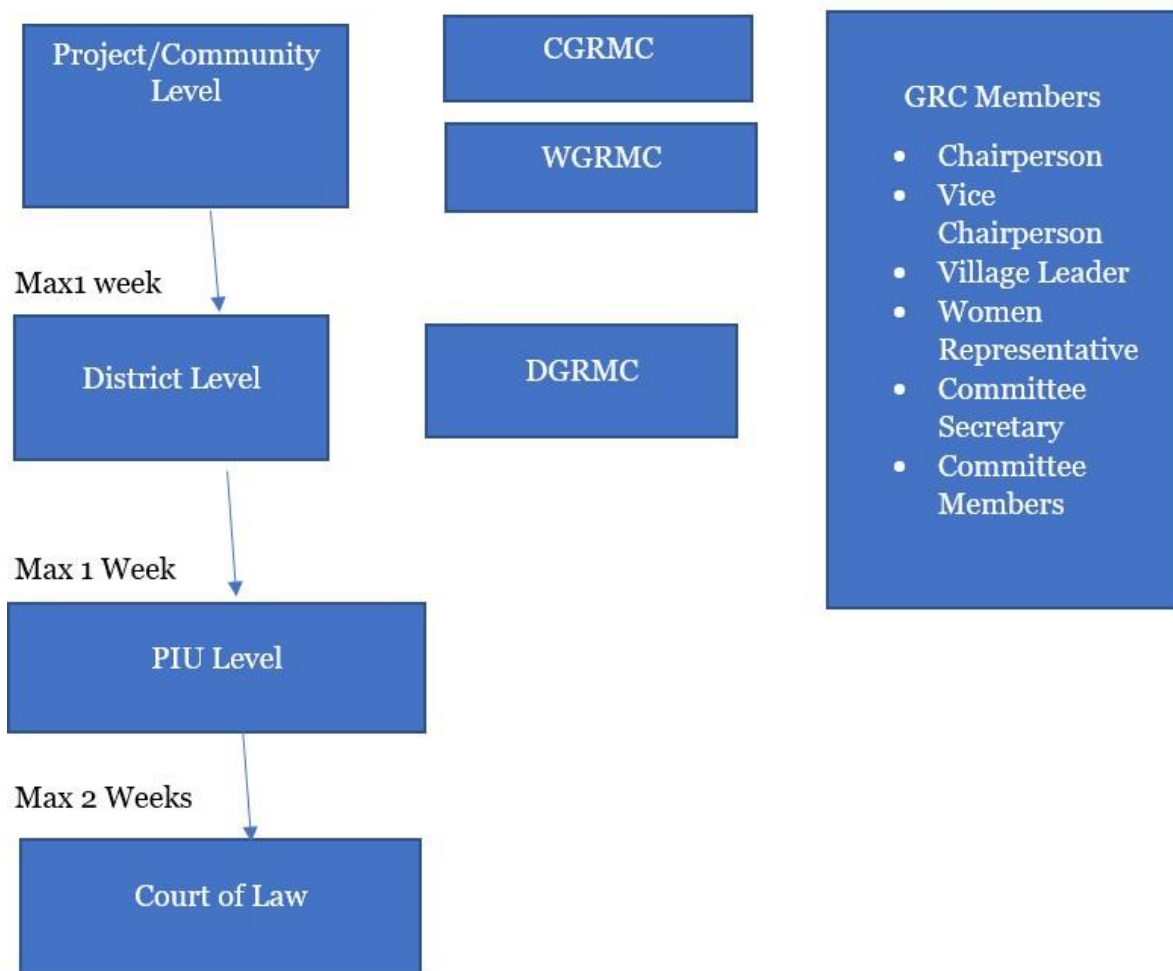


Figure 44: Grievance Redress Mechanism Structure

8.9. The GRM Process and Procedures

The GRM process consists of five stages which will be used to manage grievances for the project and these are: 1) Complaints uptake; 2) Registry; 3) Complaint assessment, acknowledgement and response; 4) Resolution or closure; 5) Evaluation of the GRM.

Stage 1: Complaint Uptake: PAPs in the respective impact areas will present their complaints or grievances to the CGRMC/WGRMC. The CGRMC/WGRMC will record all received complaints or grievances in a Grievance Community Log and Resolution Form. *Figure 45* highlights some of the complaint uptake channels.

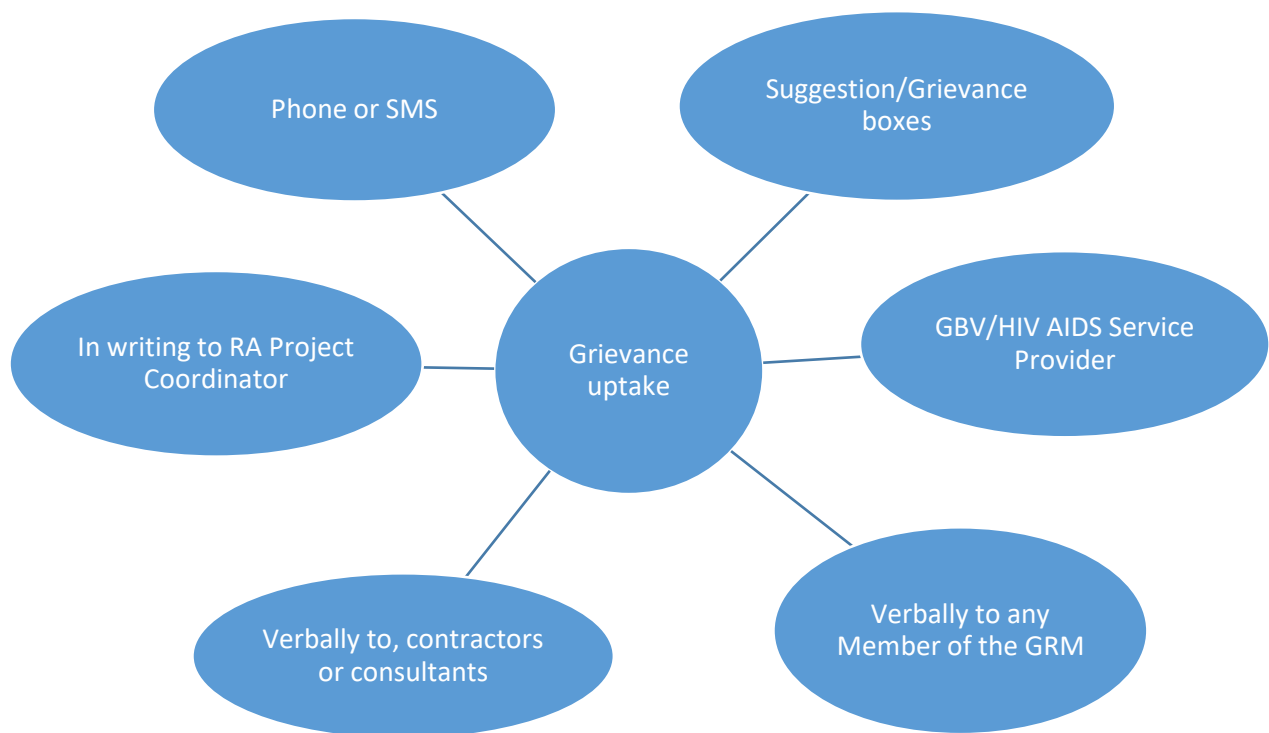


Figure 45: Grievance Channels

Stage 2: GRM Registry: All grievances received will be publicly entered into an accessible entering/recording system as the GRM registry shall be maintained at all the two GRM levels.

Stage 4: GRM Registry: the following registers and form shall be used: Workers and Border Grievance and Resolution Form (triplicate), Workers Grievance and Resolution Form (triplicate) and District Register. The Contractor will also keep a register to record all grievances raised and ensure that they are addressed and closed.

Stage 3: Assessment, Analysis and Response: When a complaint is received, a maximum of seven days has been provided for the CGRMC/WGRMC to respond to the PAP. All complaints not related to the program will be channelled to proper structures. The CGRMC/WGRMC shall hear such cases and make necessary follow ups to establish the truth. When a complaint is referred to the DGRMC, a maximum of seven days has been provided for the DGRMC to respond to the PAP. The DGRMC shall hear such cases and make necessary follow ups to establish the truth.

It is desirable that grievances are resolved at the lowest level possible and the earlier they are addressed, the better.

Stage 4: Resolution and Closure: Where a resolution has been arrived at and the PAP accepts the resolution, the PAP shall be required to sign the resolution and closure section in the Grievance Log and Resolution Form, and the case will be closed. Two members of the GRMC (Chairperson and Secretary) shall counter sign.

Stage 5: GRM Evaluation: The GRM evaluation will be undertaken alongside any other evaluation exercises for the project. This will assist to note common grievances, catchments they are originating from and other applicable relevant information. *Figure 46* summaries the grievance redress process and procedures.

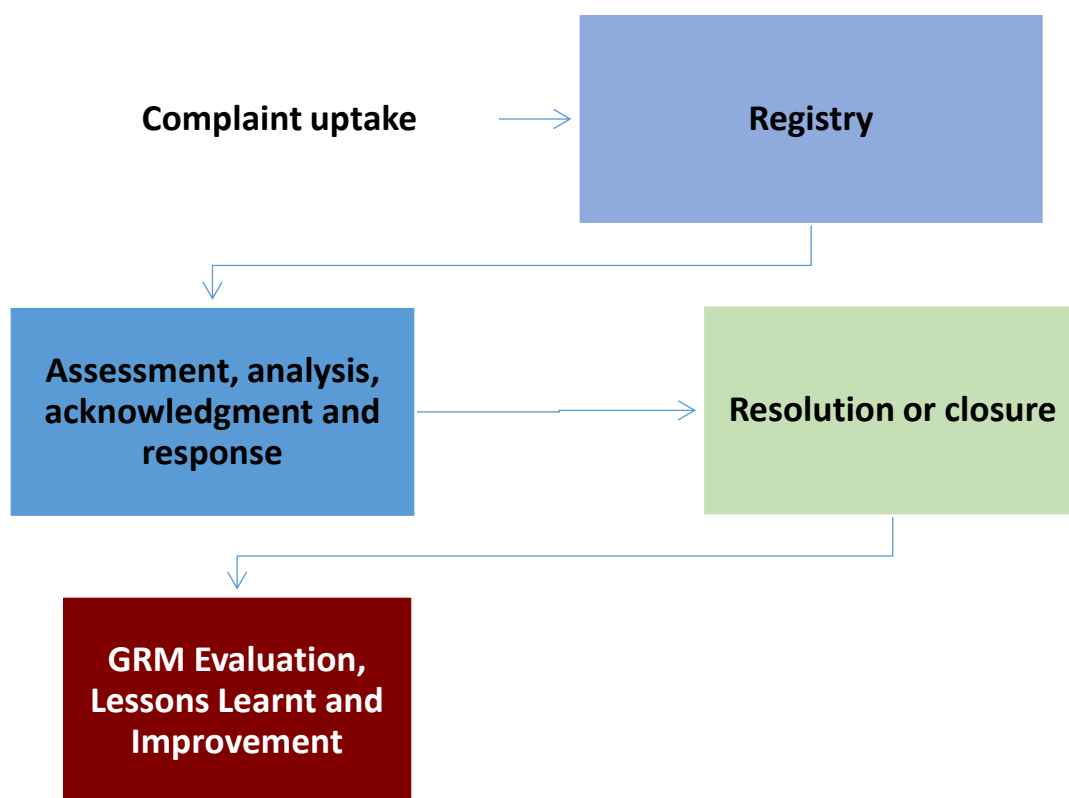


Figure 46: GRM Process and Procedures

8.10. Terms of References for Community and District Level GRCs

8.10.1. Terms of Reference for the CGRMC

The Grievances Redress Management and Workers Grievance Redress Committees will be at Project/Community level. The committees may at any time co-opt any member to help in resolving grievances if it deems necessary. The functions of the committees will:

1. Act as an entry and exit point for all grievances arising from project sites
2. Receive, record and review cases as submitted by PAPs
3. Hear and determine cases
4. Ensure safety standards, labour requirements and community health issues during implementation and report to DGRMC.
5. Prepare grievance handling progress reports and present them to the DGRMC during monthly meetings.
6. Conduct grievance redress sensitization or awareness meetings to the communities.
7. Refer grievances beyond their capacity to the Police, DGRMCs and service providers.

8.10.2. Terms of Reference for District Level GRMC

The function of this committee will be to:

1. Ensuring that grievances are resolved at district level and below.
2. Review the decisions of CGRMC.
3. Act as an appeal and exit point for all grievances lodged by Complainants.
4. Determine cases and report back to the CGRMC and the aggrieved person.
5. Ensure that transparency and accountability prevail in the implementation of the project.
6. Ensure safety standards, labor requirements and community health issues are adhered to during project implementation and way after.
7. Prepare grievance handling progress reports and present them to the District Executive committee (DEC) during monthly meetings and the RA.
8. Ensure that all grievances are documented and securely kept at the district and Border level.

8.11. Stakeholders Engagement Budget

For Stakeholders to actively participate, there is need to come up with implementation costs. The budget includes costs for Stakeholder Engagement Activities, Implement and monitor GRM duration of the project (*Table 67*).

Table -67 Stakeholders Engagement costs

Item	Description	Total Cost (MWK)	Total Cost (USD)	Remarks
1	<ul style="list-style-type: none"> Stakeholder Engagement Activities 	72, 000, 000.00	42,774.88	<ul style="list-style-type: none"> Lump sum
2	<ul style="list-style-type: none"> Implement and monitor GRM 	72, 000, 000.00	42,774.88	<ul style="list-style-type: none"> Lump sum
Sub Total		144, 000, 000.00	85,567.64	
10% Contingency	To cater for unforeseen costs	14, 400, 000. 00	8,557.81	
TOTAL		158, 400, 000.00	94,142.90	

CHAPTER NINE: CHANCE FIND PROCEDURE

9.1. Purpose of the chance find procedure

The purpose of this procedure is to identify, preserve and protect cultural heritage from adverse impacts associated with the construction of Benga – Dwangwa M005 road project. The procedure outlines what needs to be done when any worker or community members has come across archaeological sites, historical sites, remains and objects, including graveyards and individual graves during excavation or construction within the corridor. This is in recognition of the need to protecting cultural heritage from the project activities and supports preservation of such archaeological assets for future generations.

9.2. Scope of the chance find procedure

This procedure is applicable to all activities conducted by the personnel, including contractors that have the potential to uncover a heritage item/site. The procedure details the actions to be taken when a previously unidentified and potential heritage item/site is found during construction activities. Procedure outlines the roles and responsibilities and the response times required from both project staff, and any relevant heritage authority.

This procedure also addresses physical cultural resources which are defined as movable or immovable artefacts, sites, structures that have archaeological, paleontological, historical, architectural, religious, aesthetic, bio-facts and eco-facts or other cultural significance including cultural landscapes. Physical cultural resources may be located in urban or rural settings and may be above or below the ground.

9.3. Induction/Training

All personnel, especially those working on earth movements and excavations, are to be inducted on the identification of potential heritage items/sites and the relevant actions for them with regards to this procedure during the Project induction and regular toolbox talks.

9.4. Chance find procedure

If any person discovers a physical cultural resource, such as (but not limited to) archaeological sites, historical sites, remains and objects, including a cemetery and/or individual graves during excavation or construction, the following steps shall be taken:

- a) Consult with local communities, government officials and/or regulatory agencies during;
- b) Pre-construction surveys, designs and alignment familiarization regarding avoidance or mitigation of impacts to cultural heritage sites including grave yards;
- c) Where work will be taking place in the vicinity of a heritage site, the site shall be clearly demarcated to mitigate the risk of disruption as a result of construction or excavation activities;
- d) Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained;
- e) Delineate the discovered site or area and in an event of erosion implement measures to monitor downstream erosion of physical and cultural sites and implement measures to protect these sites;
- f) Secure the site to prevent any damage or loss of removable objects. In cases of removable antiquities or sensitive remains, a night guard shall be arranged until the responsible local authorities or the Department of National Antiquities take over;
- g) The Site Engineer shall inform the Site Environmental and Social experts of any Chance Find. The following data shall be corrected for reference:
 - Depth of the hole in case of excavation Chance Find
 - Digital photograph of the Chance Find
 - Geographical Positioning (GPS) readings
- h) The Environmental or Social experts shall in turn notify the responsible officer in the Departments of Antiquities or Cultural Affairs immediately (within 24 hours) and the Consulting Engineer;
- i) Responsible local authorities and the Regional Department of Antiquities/Cultural Affairs would be in charge of protecting and preserving the site before deciding on subsequent appropriate procedures;
- j) Evaluation of the findings to be performed by the archaeologists of the National Department of Antiquities (within 72 hours). The significance and importance of the findings should be assessed according to the various criteria relevant to cultural heritage; those include the aesthetic, historic, scientific or research, social and economic values;

- k) Decisions on how to handle the finding shall be taken by the responsible authorities. This could include changes in the layout (such as when finding an irremovable remain of cultural or archaeological importance) conservation, preservation, restoration and salvage;
- l) Implementation for the authority's decision concerning the management of the finding shall be communicated to Consulting Engineer in writing by Contractor's Environmental and Social experts;
- m) In circumstances where there are no technically or financially feasible alternatives to cultural heritage disturbance, and there is general consensus amongst affected stakeholders that the overall benefits of the project outweigh anticipated cultural heritage loss from removal, the removal of cultural heritage will be conducted by the best available techniques under the supervision of a qualified and experienced person prior to the commencement of business operations;
- n) Construction work could resume only after permission is given from the responsible local authorities or department responsible for culture or antiquities concerning safeguard of the heritage;
- o) In case of graveyards a community consultation shall be implemented in order to decide whether the graveyard can be over-spanned without affecting graves, trees and cultural practices or if the graveyard would need to be relocated requiring re-burial rituals.

One of the main requirements of the procedure is record keeping. All finds must be registered. Photolog, copies of communication with decision making authorities, conclusions and recommendations/guidance, implementation reports – kept.

9.5 Additional information

9.5.1. Management options for archaeological site

- **Site avoidance.** If the boundaries of the site have been delineated attempt must be made to redesign the proposed development to avoid the site. (The fastest and most cost-effective management option).
- **Mitigation.** If it is not feasible to avoid the site through redesign, it will be necessary to sample it using data collection program prior to its loss. This could include surface

collection and/or excavation. (The most expensive and time-consuming management option).

- **Site Protection.** It may be possible to protect the site through the installation of barriers during the time of the development and/or possibly for a longer term. This could include the erection of high visibility fencing around the site or covering the site area with a geotextile and then capping it with fill. The exact prescription would be site- specific.

9.5.2. Management of replicable and non-replicable heritage

Different approaches for the finds apply to replicable and non-replicable heritage.

Replicable heritage

Where tangible cultural heritage that is replicable and not critical is encountered, mitigation measures will be applied.

The mitigation hierarchy is as follows:

- Avoidance;
- Minimization of adverse impacts and implementation of restoration measures, in situ;
- Restoration of the functionality of the cultural heritage, in a different location;
- Permanent removal of historical and archaeological artefacts and structures;
- Compensation of loss – where minimization of adverse impacts and restoration not feasible.

Non-replicable heritage

Most cultural heritage is best protected by in situ preservation, since removal is likely to result in irreparable damage or even destruction of the cultural heritage.

Nonreplicable cultural heritage must not be removed unless all of the following conditions are met:

- There are no technically or financially feasible alternatives to removal;
- The overall benefits of the project conclusively outweigh the anticipated cultural heritage loss from removal; and
- Any removal of cultural heritage must be conducted using the best available technique advised by relevant authority and supervised by archaeologist.

9.5.3. Human Remains Management Options

The handling of human remains believed to be archaeological in nature requires communication according to the same procedure described above.

There are two possible courses of action:

- **Avoid.** The development project is redesigned to completely avoid the found remains. An assessment should be made as to whether the remains may be affected by residual or accumulative impacts associated with the development, and properly addressed by a comprehensive management plan.
- **Exhume.** Exhumation of the remains in a manner considered appropriate by decision makers. This will involve the predetermination of a site suitable for the reburial of the remains. Certain ceremonies or procedures may need to be followed before development activities can recommence in the area of the discovery.

9.5.4. Review

As part of the overall Health, Safety, Environment and Community Management System of the project, the Plan will serve as the basis for audits carried out by internal or external parties. This plan is subject to the review and approval of the consulting Engineers and the Client.

9.5.5. Monitoring and Reporting

Table. 68 Monitoring and Reporting

Monitoring/ Inspection	Frequency	Person Responsible	Record
Visual inspection chance find sites	Upon interaction with any archaeological find	Site Supervisor/ S Environmental Representative	Chance Find Record and Monthly Report

CHAPTER TEN: CONCLUSION AND RECOMMENDATIONS

10.1. Conclusion

The M005 road is an important road linking the Central Region along the Lakeshore to some major centers in the country as Mzuzu in the Northern Region, Blantyre in the Southern Region and Lilongwe, the Capital City. The road serves as an alternative to M1 for north bound traffic from Mozambique and Blantyre and for south bound traffic from Tanzania and Mzuzu. Therefore, it is of both national and regional significance. Besides this regional significance, the M005 road upgrading together with the widening of road is of great benefit to local communities and motorists. Some of the major positive impacts of the proposed project include:

- ✓ Employment creation which is likely to boost the local economy. Skilled, semi-skilled and unskilled labour will be required to carry out some operations and it is recommended that unskilled labour especially, be sourced from the project area. The presence of contractor workers in the project area will create effective demand for goods and services hence boosting local businesses.
- ✓ An upgraded M005 Road will help reduce travelling time and vehicle maintenance costs. Currently vehicle movement is constrained by potholes on the road, narrow road and single lane road. Also, the narrow road is shared by motorists and cyclists. An upgraded double lane road and road will result in smooth and faster movement of traffic.
- ✓ Road safety will be improved as the road and road will be widened and sharp curves smoothened. Interviews with the project area police and other relevant stakeholders reveal that most accidents along the M005 Road take place around the narrow road and sharp curves on the road. Road safety will further be enhanced by restoring road furniture including road signs. Speed humps are also recommended at settlements to slow down traffic as an improved smooth road might encourage over-speeding leading to road accidents.
- ✓ The proposed new designs for open/wider drainage structures and proposed elevation of the road profile allows for efficient drainage of flood water from the carriageway. Current M005 Road is characterised by flooding at some sections.
- ✓ An upgraded M005 Road is likely to attract more vehicles from both the north (Mzuzu) and southern parts (Blantyre) of the country using the road. The road

might also attract increased volumes of cross border traffic including delivery trucks. Illovo Sugar Limited's is also likely to benefit from an upgraded M005 Road in terms of moving goods to the market and inputs from the main centres. Also, medium and small scale business like petrol stations, grocery outlets, restaurants, lodges, vendors, farmers, fishermen etc. will also definitely benefit from an expanded customer base resulting from an increase in road users.

Notwithstanding the above stated positive impacts of the project, quite a number of negative impacts have been identified. Some of the potential negative biophysical impacts of the proposed project include generation of waste and its impact on soils, water and air quality, challenges of waste management at camp and worksites, clearance of vegetation, general disturbance to wildlife, interference with project area rivers and streams riparian buffer zones and noise and vibration (resulting from movement of construction machinery and vehicles). Some of the potential negative socio-economic impacts of the proposed project include displacement of properties and service infrastructure, resettlement and relocation, possible increase in incidences of sexually transmitted illnesses (STIs) including HIV/AIDS, Disruption of traffic due to construction works and diversions and also the challenges of occupational health and safety emanating from poor working conditions if allowed to exist. There will also be negative socioeconomic impacts during project operation i.e. after completion of the proposed project. Some of these impacts are possible encroachment onto the road reserve, theft and or vandalism of road furniture, possible increase in incidences of sexually transmitted illnesses (STIs) including HIV/AIDS as a result of increased motorists plying the M005 Road.

For all the identified negative impacts of the proposed project, mitigation measures have been suggested. Some of the proposed mitigation measures for negative environmental impacts include construction of erosion control structures such as Check dams, diversion banks and filtration structures, storing materials and establishing campsites outside drainage lines, ensuring that fuel and oils storage areas are adequately bundled, providing dust mask and respirators to those people who operate or work near machines, or work in dust prone areas and asphalt preparation or application areas, dust minimized by occasional water sprinkling of access routes and work areas, only trees interfering with construction servitude

to be removed, cleared areas to be re-vegetated through tree planting programmes and appropriate landscaping, ensure natural drainage systems are not altered and drainage systems should not be oriented directly towards the river.

The report also identified mitigation measures for the identified negative socioeconomic impacts. Some of the mitigation measures include preparation of a Resettlement Action Plan (RAP) for the displaced, development and implementation of a fully fledged HIV/AIDS programme both for the contractor staff and the residents of the project area, adequate signage to warn motorists of the presence of contractor vehicles and machinery on the road and of the road diversions and providing all the workers with protective equipment/wear and impose their use.

The E&SIA proposed adequate mitigation measures for identified impacts which must be implemented by relevant stakeholders in order to minimize their effects. In general the negative impacts outweigh the positive impacts of the project in the short-term. However, in the long term, the benefits of the road outweigh the negative impacts. In order to maximize the benefits, the implementation of the Environmental and Social Management Plan should be closely monitored to ensure that all proposed mitigation measures are adequately and timely implemented.

10.2. Recommendations

The study makes the following recommendations:

- a) It is recommended that the proposed project go ahead and proposed mitigation measures as captured in the Environmental and Social Management Plan be fully implemented;
- b) All displaced parties should be identified, their property valued and subsequently compensated;
- c) The RA should ensure that the Contractor should comply with legal obligations related to this project and should use the National Environmental Standards as a guide for emission limits. In the absence of national standards, the contractor should use other internationally acceptable standards for the limits;

- d) The contractor should closely work with district authorities during the entire project implementation period;
- e) The contractor should develop a fully fledged HIV/AIDS programme both for the sensitization of contractors staff and the general public;
- f) All workers at work sites must all be provided with protective clothing/wear and its use made compulsory;
- g) The contractor should prepare monthly progress reports on environmental and social management activities and submit to the consultant and direct to PIU/RA;
- h) The contractor should follow all the formalities related to development control and approval systems for this nature of projects;
- i) Stakeholder site meetings should regularly be organised by the PIU/RA in liaison with the consultant and contractor to discuss the implementation of the ESMP; and
- j) RA should ensure that the requirements of the implementation of the ESMP/RAP are incorporated in the bid documents.

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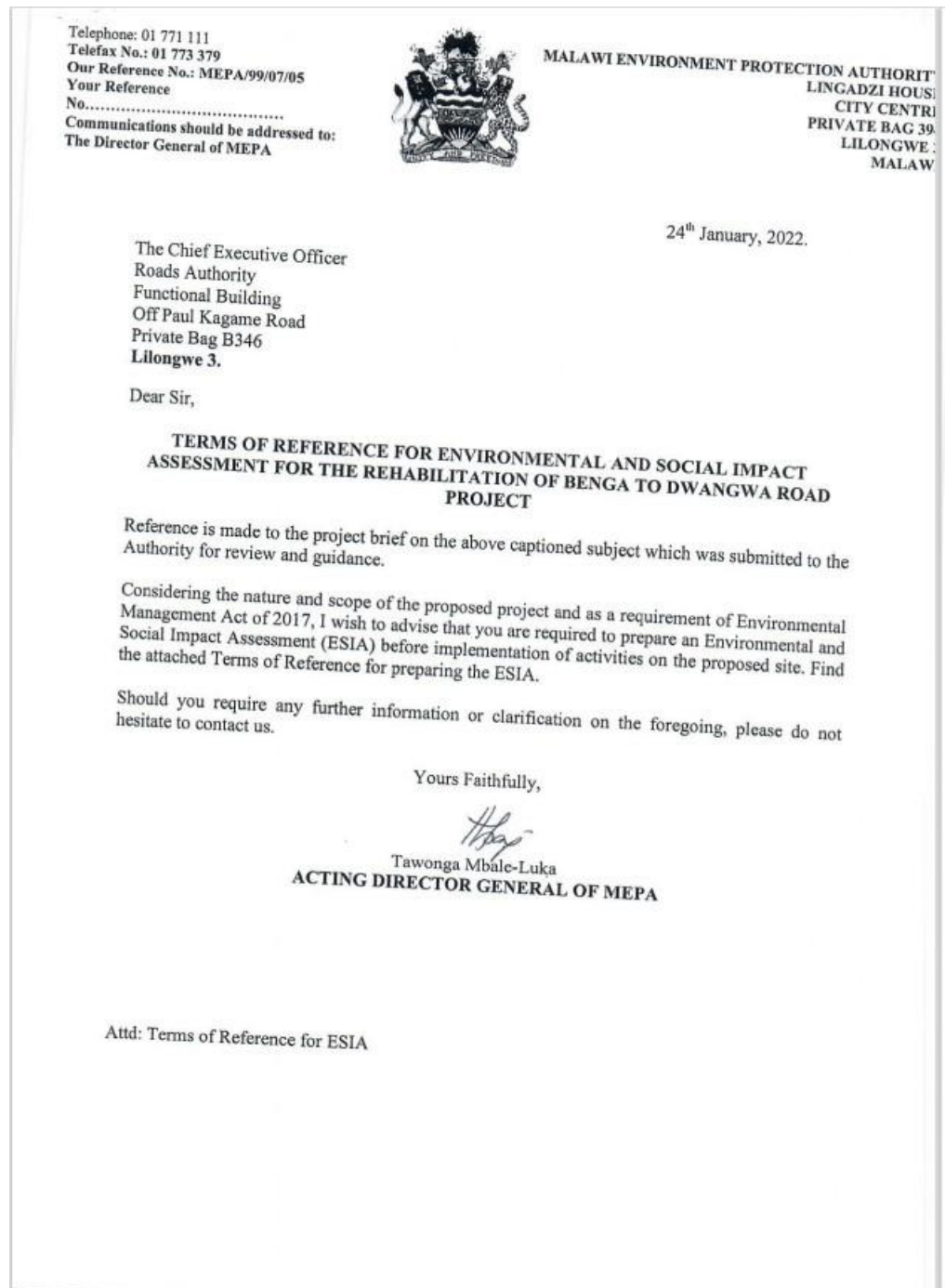
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ANNEXES

ANNEX 1: TERMS OF REFERENCE (TORS)

A1.1 ToRs Provided by MEPA



**TERMS OF REFERENCE FOR ENVIRONMENTAL AND SOCIAL IMPACT
ASSESSMENT FOR THE REHABILITATION OF BENG TO DWANGWA ROAD
PROJECT**

1. Provide a full description of the nature/components of the proposed project with respect to the name of the proponent, postal and physical address, aim and objectives of 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), nature of roads works, source of raw materials (borrow pits and quarries to be developed) and waste types to be generated, and waste disposal.
2. Describe main activities to be undertaken in the construction (or rehabilitation and upgrading) of the road. Identify the main construction and operation activities of the project including access roads, source of raw materials (quarries and borrow pits), storm water drainage, road works, road safety features, drainage systems (soil and water measures) and sanitary facilities. In the description also 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.
3. Provide a site specific map of the area (Scale 1:50,000) showing the proposed project site and (1:10,000) showing existing establishment in the proposed area and surrounding areas. A site plan of the project should also be provided.
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, business activities, basic infrastructure and health situation; and
 - Any changes anticipated during implementation of the project area. Provide a description of HIV/AIDS prevalence rates in the proposed project sites.
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 project' alternative. The ESIA should also consider 'within – project' alternatives e.g. designs, technology etc.
6. Predict environmental and social 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 forest reserves, loss of agricultural land, loss of grazing pastures, impact on water resources, impact on flora and fauna, impact on cultural site, and resettlement of people);
 - Project design (e.g. drainage problem, fire safety designs, and other structures);
 - Construction works (e.g. soil erosion, dust pollution, noise, disposal of construction spoils); and
 - Project operation (e.g. pollution by stored oil, fire risks to surrounding community, impacts on soil such as surface erosion and runoff, conflict of use) 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 and Social 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 and Social Management and 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, Water Resources Act, National Water Policy, National Environment Policy, Malawi National Land Policy, Public Health Act, 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 licences 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.

11. Undertake stakeholder consultation to ensure key interested and affected stakeholders are involved in the Environmental and Social Impact Assessment process. Incorporate their views in the report and indicate a record of consultations in the appendices parts of the report.
12. Ensure that District Commissioners and EDO for Nkhosakota are consulted on the project.
13. 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.
14. The minimum content of required information in an EIA Report is outlined in pages 53-59.
14. The ESIA team should include the following experts:
 - Environmental Impact Assessment Expert;
 - Social Expert; and
 - Civil Engineer;
15. Attach a copy of an approval letter for the Resettlement Action Plan from Ministry of Lands in the appendices
16. Submit 2 hard copied to the Malawi Environment Protection Authority for preliminary review before submission of 15 hard copies for Advisory Committee on Environmental and Social Assessment Review and a soft copy of the ESIA report to the Director General of the Malawi Environment Protection Authority.
17. Provide the names of the ESIA Team and their respective fields and attach them as annex of the ESIA report.
18. Printing of ESIA report should be one sided using Times New Roman, font size 12.

A1.2 ToRs Provided by the Roads Authority

Terms of Reference for Updating ESIA Report for Benga –Dwangwa Road Project

1.0 Background

The policy of the Government of Malawi (GoM) towards the roads sub-sector is to build, maintain and ensure efficient utilization of the road infrastructure and other services appropriate to meet the current and future development needs of the economy. The Government of Malawi through the Roads Authority (RA) intends to upgrade/rehabilitate/reconstruct the Kaphatenga - Dwangwa Road (M005) to a standard of 7 metres wide carriageway and 2 metres wide sealed shoulders on either side of the carriageway and upgrade drainage structures including single lane bridges to double lane. The M005 Road is one of the primary overland transportation corridors in Malawi. Detailed engineering design for road section was done in 2013 and covers the Kaphatenga to Dwangwa road section and Benga to Dwangwa is part of the designed section which is approximately 105km long. The road is paved, and the alignment is of mainly long straight lengths with curved sections the sharpest of which are found between Nkhotakota Town and Dwangwa Trading Centre.

The Kaphatenga – Nkhotakota - Dwangwa (M005) Road is part of the lakeshore road located in the coastal plain between Lake Malawi and the plateau on the west. The road which is approximately 160kms long was constructed between 1976 and 1978. Several sections of the road have deteriorated and are in need of upgrading/rehabilitation/reconstruction while others are low-lying as such they are often flooded during the rainy season. In addition, the existing road has numerous single lane bridges the majority of which have low hydraulic capacity evidenced by overtopping. Those across the Lifyodzi and Chibothera Rivers were washed away in October 2006 and March 2009 respectively and as such need to be replaced with permanent structures. There are 32 existing bridges along the road. The single lane bridges are 15 including 2 Bailey bridges and the rest are double lane.

All single lane bridges along the proposed project shall be replaced with new bridges. Hydrological studies were carried out on these crossings to establish the flood discharges

and openings required for the bridges. A minimum 1 in 50 years flood frequency was assumed for the design of bridges.

Out of the 17 double lane bridges, flooding history and hydrological studies confirmed that 3 of them namely, Lunga River Bridge, Kasangadzi River Bridge and Chamachete River Bridge have inadequate hydraulic capacity and shall therefore be replaced with new bridges. The rest of double lane bridges shall be retained as they are in good condition and have adequate hydraulic capacity. Only minor repairs will be carried out on some bridges. There shall therefore be 18 new bridges 5 of which shall be 3 spans, 8 shall be 2 spans and 5 shall be single spans.

The proposed road construction project is in line with the Malawi Vision 2063, which provides the need for world-class, well maintained and expanding road networks connecting the urban and rural areas to local and international markets. It further emphasizes on upgrading all main roads to bitumen standard linking to world-class national and regional motor ways fully supported with multi-year maintenance programmes. Therefore, this project will contribute in achieving the vision as it aims to developing the road sector in the country by raising the standards of the national road network and connecting the country from north to south through the Lakeshore as part of the Ntwala road corridor. The project will also result in creation of employment opportunities, and promote knowledge and skills transfer, for communities surrounding the project sites. The project will also improve efficiency of traffic and safety measures on the road. It will also help in improving industrial manufacturing including the agricultural production and better access to social services as it will reduce travel time and business operating costs.

2.0 Objective

The objective of the ESIA Update is to incorporate additional works that were not included under Phase 1. The revision in the ESIA will thus include assessment of impacts from rehabilitation of the gravel roads. The update of the ESIA will specifically focus on including any anticipated environmental and social impacts associated with the rehabilitation of gravel roads.

3.0 ESIA Update requirements/criteria

The key criteria, but not exhaustive, to consider in updating the ESIA:

- The E&S requirements of AfDB requirements related to stakeholder engagement, labor working conditions and management of waste;
- The applicable national E&S legislations, regulations, norms, standards, and procedures to be followed when assessing impacts on the gravel roads;
- The requirements of the Bank's Integrated Safeguards System (ISS);
- Approved and/or published project environmental and social documents such as approved ESIA and approved RAP for the project;
- The Good International Industrial Practices (GIIP) of the Project's sector, if any.

4.0 Scope of Services

In updating the ESIA, the Consultant shall update all the chapters of the ESIA report by incorporating the additional works related with gravel roads and associated drainage structures component. Specifically, the update of ESIA should focus on the following areas of interest:

- a. Update ESIA by including identified and analyzed environmental and social impacts associated with rehabilitation of the gravel roads and associated drainage infrastructure.
- b. Updating / development of the Stakeholder Engagement Plan, Waste Management Plan, Occupational Health and Safety Plan, and other relevant management plans. Attach them as annex of updated ESIA report.
- c. The preparation, presentation and structure of updated ESIA 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 ESIA Report is outlined on pages 53-59.
- d. Provide the names of the ESIA Team under annex of the updated ESIA report and their roles and respective fields.

5.0 Coordination

The Consultant will coordinate with the Roads Authority (RA), the Ministry of Transport and Public Works, and the African Development Bank (AfDB). The client will facilitate initial contacts with all relevant parties and should be invited to all subsequent

meetings with all relevant stakeholders. It is anticipated that the Ministry and Roads Authority will assist the consultants in identifying appropriate permit requirements. Coordination with the client's engineering team is extremely important to ensure that the environmental and social impacts and risks are well taken into consideration. This coordination is also necessary to ensure that all work streams are being efficiently done in parallel that is ESIA, ESMP, LMP, WMP and SEP.

1. Schedule of the Study and Reports

The assignment is expected to be completed within 8 weeks.

The Consultant will submit to the Client:

- (a) **Interim Report:** to be provided within one week of commencement. This shall include the ESIA with attached Stakeholder Engagement Plan (SEP), Waste Management Plan, Occupational Health and Safety Plan.
- (b) **Draft Report:** draft report to be provided within two (2) weeks for review by the AfDB, the client and national authorities. All comments provided shall be included in the revision.
- (c) **Final updated ESIA Report:** to be provided to RA for clearance to AfDB after eight (8) weeks from commencement of assignment.

2. Facilities to be provided by the Client

The Client will provide the following facilities:

- a) All previous Environmental and Social Reports ESIA
- b) Desktop map of the existent project site
- c) Access to relevant information to the extent of its availability.
- d) Access to the site belonging to the Clients as may be necessary.

3. Conduct of Work

The consultant/s will be expected to be fluent in English and be able to work closely with the clients' staff and other third parties relevant to the assessment. All documentation shall be in English and work is expected to be completed within Eight (8) weeks of signature.

4. Consultant Profile:

Consultant's profile: This assignment is expected to require around one and half staff/months of key staff and to be delivered over two months' period. It is expected that the Consultant would establish a strong core team of specialists. It is envisaged that an experienced environmental or social specialist would serve as the ESIA Project Team Leader. The Consultant should complement the skills of the core team with other social, environmental, technical, and institutional specialists with experience in AfDB funded projects. Ideally, the social specialists will have previous experience working with the African Development Bank's social safeguards requirements and prior experience in developing ESIA, WMP, OHSP and SEP.

The team is expected to provide pragmatic and insightful planning to complete the above scope of work. The Consultant shall propose and justify the range of disciplines to be included in the core Project team and the complementary skills of other short-term specialists. The inputs of all specialists shall be clearly indicated as it is anticipated that most of the work program would be carried out by individuals highly experienced in their professional fields and aligned with the tasks assigned.

Primary skills and specialties of the team are suggested below:

- a. **ESIA Team Leader (Environmental Specialist)** : He/she shall have as a minimum a Masters in Environmental Sciences or Masters in any related natural science degree from a recognised university with a minimum of 5 years proven experience in conducting similar assignments and a minimum of five projects as an Environmental specialist including Bank funded projects.
- b. **Social Expert:** He/she shall have as a minimum Masters in Social Sciences or Gender Studies from a recognized university with a minimum of 5 years proven experience in conducting similar assignments and a minimum of three projects as a Social Specialist including Bank funded projects.
- c. **Civil Engineer:** He/ She should be professionally qualified Civil Engineer with a minimum qualification of B.Sc. in Civil Engineering or the equivalent, with a minimum of 5 years' experience in conducting similar assignments and a minimum of three projects as a Social Specialist including Bank funded projects.

The team shall include specialists who are highly familiar with specifying detailed mitigation measures, focused training programs, and structured monitoring programs.

The entire proposed Project Team should be able to cover the areas listed below:

Summary List of Suggested Specialists:

Key Specialists

- Environmental Specialist;
- Social Specialist.
- Civil Engineer

Non-key specialists

- Waste Management Specialist;
- Environmental health and safety specialist;
- Ecologist;
- Biologist;
- Geologist;

Also, the Consultant could include other specialists.

The Consultant shall name individuals to participate in specified roles within the Project Team and provide full curricula vitae and any other information considered relevant by the Consultant. The Consultant shall name the Project Leader, and the other core team members and key short-term specialists and provide an assurance that all members of the proposed team will be made available as specified in the proposal. The team members should have experience in environmental assessment of large-scale infrastructure projects in Africa and must have familiarity with the African Development Bank requirements and guidelines.

ANNEX 2: STAKEHOLDER CONSULTATIONS

The exercise undertook consultations with national level staff from different Departments and Organisations to seek policy directions and the importance of the proposed road project, Nkhota-kota District Environmental Sub-Committee (DESC) to seek level of acceptance by the District councils and also the environmental concerns and Village Development Committees to seek level of acceptance and their concerns over the project. Not only that but also Improve transparency and accountability of decision-making and Increase public confidence in the Environmental and Social Impact Assessment process. Stakeholder participation in this project was facilitated through in-depth interviews and Focus Group Discussions (FGD) that are presented in following sections.

A2.1 National Level Consultation

1. DEPTIMENT OF FORESTRY – Consultation with Deputy Director of Forestry

Trees will definatry be affected, therefore you need to make sure that tree replacement is planned for and implemented.

Having proper vegetation along the road would improve the strength of the road

It would also help ith prevention of floods along the road area

After the road is completed, it would negatively aid the illegal movement of forestry resources.

Work ell with communities so to invove them more in protection of the forestry resources.

VNRMC is a local structure that the project can work with in implementing mitigation measures.

Benefits for operation phase.

Fast and easily traveling for the department to implement different programs.

- The issue that needs improvement in these processes (ESIA) is Lack of consultation with the department of forestry.

Legal framework

Forestry act 1997

Malawi forestry policy 2016

National Forest landscape Restoration strategy

2. MINISTRY OF LABOUR – Interview with Regional Occupational Safety And Health Officer

The contractor will need to register with ministry of Labour – Certificate of Registration of a Work Place

According to **OSHAWA 1997**;

- The contractor will need to always conduct risk assessment -identification of hazards and their mitigations
- Have first aids kit and a qualified first aider.
- Make provision of drinking water, mobile toilets etc
- Make provision of transportation in case of injuries; the means of transportation should suit with the distance to the nearest hospital.
- All accidents and injuries that require medical attention should be reported to ministry of labour within 3 days.

COVID-19

The contractor should follow the “Work place guidelines – **MALAWI PUBLIC HEALTH (CORONAVIRUS and COVID-19) Prevention, Containment and Management Rules (2020)**).

Employment Act 2000

- Have signed contracts with the workers, with terms and conditions.
- Payment should not be below minimum wage but we encourage paying above the minimum wage.

Pension Act 2011

- All workers should be put on pension
- Provide holidays and sick leave

HIV/AIDS PREVENTION AND MANAGEMENT ACT 2018

- HIV/AIDS at work place is under ministry of Labour

Industrial relation act 1996

- It sheds light on rights at work.

COMPENSION ACT 2000

TRAFFICING PERSONS ACT – 2015

- E.G some workers were taken from karonga to work in Chikwawa and then left stranded there.

Address issues of child labour

- Don't employ anyone under 18 years
- Check national ID

Address issues of violence and sexual harassment at work place.

3. MINISTRY OF TRANSPORT (ROADS DEPARTMENT) – Interview with Deputy Director of Roads

- Erosion and siltation are a major issue that should be considered, most drains and water ways are quickly filled up with silt. The design should take this in serious consideration.
- Issues of gender-based violence should be considered.
- The single road are death traps and they are not in sound shape.
- The weigh bridge is being constructed will help to manage overloading which will affect the roads life span.

Positives during operation

- A good lakeshore road will improve tourism.
- It will reduce maintenance cost for the road.
- It will reduce operation and maintenance costs for vehicles.
- It will improve the quality of public transportation along this corridor.
- The cost of transportation will reduce due to competitiveness.
- It will improve the livelihood of the locals.
- Transportation of goods will be faster; e.g fresh fish.

During construction

- Employment opportunities for the locals.
- It will lead to skill transfer as people work at the project.
- Businesses will boom and it will mostly be women who will benefit because it is mostly women who do food businesses and other small and medium businesses.

Enhancement on employment

Emphasis to the contractor to employ locals on unskilled labour works.

Negatives during operation

Accidents due to speeding and also due to carelessness of the locals near the road because they are used to less traffic.

Mitigation

Put in place road safety structures – humps, roads signs, warning signs – warn road used about busy sections like trading centers.

During contraction

- Soil erosion as the result of construction works can affect chia lagoon.
- Social and culture disturbance due to migrate workers leading to conflicts.

A2.2 District Level Consultations

A2.2.1 Meeting With District Environmental Sub – Committee (DESC)

DATE: 21ST JANUARY, 2022

Facilitator: David Mtekateka

Note taker: Chimango Kamanga

About the project

1. What is the importance of the road to the district minus the proposed rehabilitation works?
 - It's the gateway from the north to south [transport sugar]
 - Connects districts to districts when transporting produce
 - Generates foreign currency from Tanzania
 - Tourists use the road to access the lake and the game reserve
 - Easy transport the fish from the lake without being perished
 - Easy transport charcoal
2. What is the current status of the road and its surrounding environment?
 - a. Known socio-economic issues
 - Transport agricultural produce
 - Attract tourists
 - b. Known environmental issues
 - Fish move from the lake to breed in the upland rivers through culverts and road so making sure that these passages are available is crucial (e. g chia bridge, Bua bridge and Kaombe bridge)
 - Charcoal and chamba is easily transported on the road enhancing deforestation.
 - Unproper disposal of wrappers and plastics can cause environmental degradation.

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure
A1	Job creation to the locals as labourers	

A2	Find relationships and assisted economically	
A3	Business along the road flourishes	Need for loan giving facilities upgrade peoples business'
A4	Most people would rent out there houses those working in the construction company	
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	Help fish breeding (fish will move from t lake to the river where they breed)	Make proper bridged Put box culverts (to avoid blocking t water ways coming from the lake to t rivers)
B2	Transportation of sugar, agricultural produ and fish	Wide roads will enable bulk carri vehicles to transport bulk amount products.
B3	Easy access to schools	Good roads that will ease up mobility
B4	Upgrade from village to city	
B5	Boost local businesses	Most people will come from elsewhere to do business in nkhotakota there promoting local trade.
B6	Easy mobility therefore faster traveling whi will reduce transport fair	
B7	Accidents will be reduced since most buildin built along the road will be removed there less people won't be doing business' along t road	
B8	The road will attract more tourists to vi there national park, lake the Chia lagoon	

NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure
A1	Child labour (17 below)	Community sensitization
A2	Gender based violence	Community sensitization
A3	Equal employment and pay	Community sensitization and follow labour laws
A4	Demolishing houses and buildings in the RPA	Compensating them
A5	Trees in along the road will be cut down	Compensating them
A6	Irresponsible fathers just impregnating and leave the locals with fatherless children but also transmission of HIV/AIDS.	Responsible NGOs to sensitize both the locals and the workers constructing the road on the dangers or impacts of such behaviours
Operation phase		
B	Negative Impacts	Mitigation Measure
B1	Wild animals get killed due to speeding	Put humps in the game reserve section
B2	Pollution of the road by users throwing plastic bottles (drinks from Tanzania eazam)	
B3	Accidents will increase due to speeding	Put humps, road signs and double lane road

3. What alternatives projects or solutions to the proposed project would you suggest?

- Put box culverts
- Double lane road
- Proper road signs
- Put humps in trading centres, schools, hospital, road section passing the game reserve etc.

- Don't let people cultivate along the road
 - The contractor shouldn't buy sand from illegal sand miners (e. g those who mine in along the river banks near the roads)
 - Protocols should be followed to the right department on where to extract the resources e. g gravel
 - Any job that is unskilled should be provided to the locals
 - Follow labour laws i.e. don't pay less than the minimum wages
 - Provision of rumble surfaces on long stretches
 - Provision of dumping sites by the contractors
 - Equal employment and equal pay for both genders
4. What mechanisms does the council have in place to monitor implementation of mitigation measures that will be outlined in the environmental social and health safety management plan? How effective are they?
- The council should put in place laws that will involve equal participation with the responsible authorities but also the local authorities to monitor each phase of the project in a way that a contractor has to first consult the council to outsource information on where he can get construction materials like sand and gravel rather than buying from those mining in river banks but also excavating gravel in prohibited areas and leaving behind burrow pits.
- N:B community sensitization as a mitigation
- Ensure laws to do with avoiding child labour
- Avoid gender based violence
5. Does the district have a waste (solid and liquid) management plan?
- No
6. Does the district have designated dumpsites or landfills?
- No
7. How will the rehabilitation of the road affect the people and the natural environment?
- This will affect the peoples livelihoods in a way because most people have businesses along the road that there customers are used to so it's hard to adapt in a new settlement or business environment.

- Most people planted trees along the road so by cutting these trees for the road section will affect the environment negatively.
- Most machines have leakages in oil and other fuels that litter along the road that in turn are washed into the surrounding water bodies affecting aquatic life so the checking of such leakages by the contractor before mobilisation of the equipment is necessary.
- The throwing of food wrappers along the road by road users.

A2.2.2 Kils with Nkhotakota District Council Departments

Agriculture Department

1. EPAs around the project area
 - ✓ Mtosa, Zidyana, Linga, Mphonde, Nkhunga
2. Crops and Animals
 - ✓ Crops: maize, groundnuts, sugarcane, cassava;
 - ✓ Animals: goats, pigs, cattle, poultry
3. climatic conditions
 - ✓ Cool to warm weather
4. rainfall pattern
 - ✓ Normal to above normal in many years
5. topography and geology
 - ✓ Along the lake land is relatively flat; moving away from the lake its hilly
6. type of soils
 - ✓ Sandy loam alluvial soils
7. cooperatives in this sector Agriculture/CDO
 - ✓ Bua cooperatives

Updated data in Agriculture – December 2023

District status: 8% food insecurity

	# of farming hh	# of food insecure hh	percentage
Nkhunga	25,319	983	4%
Mphonde	9,636	1,253	13%
Linga	30,423	922	3%
Zidyana	18,858	2,452	13%
Ntosa	11,641	565	5%

EPA's Zidyana, Ntosa and part of Nkhunga received heavy rains when the maize crop was drying up which resulted in losses to rottenness

Mphonde EPA registered loss production because fertilizer was distributed very late

CASH CROP	Farm gate prices	Prevailing Market prices
Rice		1,600 – 2000
Maize		600 – 750
Bananas		8,000 – 12,000
Cassava		600 - 1000
groundnuts		2000

District Community Development

1. major languages spoken in the area Social
 - ✓ Chichewa is the major language
2. Religions
 - ✓ Christianity above 75%, and muslims

Fisheries

The project will affect marine life:

- Increase sedimentation in aquatic environment which will increase water turbidity which affects fish gills, making fish fail to detect predators and limit photosynthesis process in plants in project area
- It will have impact on fisheries resources, since this project will reduce dissolved oxygen in aquatic environment which may result in mortality of organisms
- It may change soil water contents and result in algae bloom
- Marine fauna and flora:
 - a. Noise may affect nearby habitat and disturb the movement patterns of certain organisms
 - b. Marine plants in the area: water hyacinth, algae, vallisneria, stuckeria pectinate

- Marine animals: fish, butterflies, crocodiles, hipos, snakes, birds, bees, ants, beetles, and crickets
- Statistics
 - a. There is high density of habitats within project area which includes Lake Malawi, rivers, lagoons and sanctuaries. Its aquatic environment has emergent and submerged aquatic breeding habitats for a wide array of species including Chisawasawa, mbaba, mlamba, chambo, mpasa, utaka, and nchila. The district average fish catch its water bodies is at 27.5 metric tonnes annually
- Endangered species:
 - a. Plants: algae
 - b. Animals: Oreochromis karongae (chambo), labeo mesops (Ntchila), Opsaridium microlepis (mpasa)
- Community structures
 - a. We have beach village committees; they manage to mobilize fishing communities to manage their own fisheries resources
- On Chiya Lagoon
 - a. Fisheries manages Chiya lagoon; have a project, Fish for Tomorrow funded by RIPO africa: environmental conservation of fish, trees; discouraging people from cultivating close to the beach; prevention of dumping of waste; prevention of use of devastating fishing practices
 - b. Have beach village committees around the lagoon: looking after fishing spots, 14 in number
 - c. Fish product is increasing, benefiting the district income; supply surrounding communities with irrigation of water; tourism wise, attract tourists thus boosting district revenue
 - d. Issues
 - Siltation caused by poor farming practices in upland communities (August, September October, heavy siltation) threatening to dry up the lagoon in future

- Deforestation of the beach and upland by opening up of more farm land; resulting in soil erosion

• YEAR	TOTAL LANDED CATCH	FISHING EFFORTS	CPUE	Rel. CPUE
2018	28345	13834.37	2.05	1.02
2019	27029	13805	1.96	1.0
2020	27309.76	11916.22	2.3	1.1
2021	34898.76	11068.53	3.15	1.6

- Use of poisonous herbs when fishing (kapute)
 - Use of illegal gears: other fishers use mosquito nets for fishing catching fingerings affecting future population
 - Rice farming: farming in shallow areas of the lagoon
- e. Coordination with the district agriculture sector: both under directorate of agriculture; work together in different structures at district and ADC level (DIC, agric service committee. Collaborate in dealing with issues surrounding chiya lagoon which are cutting across the two sectors. Work with forestry and community development – carry messages across to different community level forums – well coordinated information flow. Agric service committee includes councilors and TAs

NKHOTAKOTA DISTRICT FISHERIES CAPTURE FISHERIES DATA

Forestry Department

- Forest areas/ woodlots available: public, private and communal along the road stretch
 - Species: Miyombo like Tsamba, Mlombwa, and exotic like bluegum, Leshya, Mtangatenga
- Protected species: Mlombwa, mbawa, Katope, Napini
- There are about 100 VNRNCs in the area

- Current status of flora and fauna
 - Not so diverse due to over exploitation; fauna species are diverse and rich in Nkhotakota wildlife reserve
- Geology
 - Clay, loam and sandy soils dominate – dambo/waterlogged some areas
- Climate: tropical; rainfall: average 1000m, Max 1700, Min 400; Temperature: Average 28.7 degree Max?, Min: 20 degrees; warmest November, Coolest July

Environmental Department

- Environmental issues
 - Land degradation
 - Water pollution, depletion
 - Waste management
 - Deforestation
 - Illegal sand mining
 - Soil erosion

Rivers crossing targeted road section

- Chirua, TA Mwadzama (floods)
- Nkhula, TA Mwadama
- Lipsodzi, TA Mwadzama
- Navikoko, TA Mwadzama
- Chia, TA Kalimanjira
- Chota, TA Kalimanjira (small)
- Lingona, TA Kalimanjira (small)
- Kaombe, TA Mphonde
- Bua, TA Mphonde, TA Kanyenda
- Navonde, TA Kanyenda (small)
- Kamwala, TA Kanyenda
- Msenjere, TA Kanyenda
- Liwaladzi, TA Kanyenda

- Malanatha, TA Kanyenda
- Mikongwe, TA Kanyenda
- Dwangwa, TA Kanyenda

- a. Most of the rivers do flood: Chuluwa, Nkhula, Lipsodzi, Kaombe, Bua, Dwangwa

used for agriculture both crop and animal production: irrigation, fishing and domestic purposes

Sanitation and waste management - District Environmental Office (EDO)

Waste collection from the main market centers is through tractors to a common dumping place. These wastes however, are not graded and are dumped in their mixed form. Most of the wastes are not biodegradable. On the other hand, ILLOVO sugar Company, however, has a mechanism where wastes are graded into biodegradable and non-biodegradable, solid and liquid. Their liquid wastes such as expired oils are disposed through chemicals and marketing company in Blantyre for incineration.

The common method of disposal of human waste is through pit latrines and septic tank system.

Traditional Authority	# of household	# of basic latrine	# of improved latrines	Total
Kanyenda	26,811	23,830 (89%)	2,445 (9%)	26,275
Malengachanzi	13,379	11,660 (87%)	1,184 (9%)	12,844
Mphonde	5,767	5,088 (88%)	391 (7%)	5,479
Mwadzama	17,187	15,334 (89%)	993 (6%)	16,327

(2013 data)

According to Nkhotakota District Health Office, 78,025 households in the district use latrines. Of these, 71, 203 of the households have basic pit latrines and 6, 822 have improved latrines.

The district has been declared Open Defecation Free by the National ODF Task Force and the latrine coverage for the district is at 97% and sharing is at 3%.

Solid wastes are indiscriminately disposed on open grounds and in the bush. There is no waste collection service in the district. According to the EDO reports, 2013: about 73% of the population in the district dumps waste illegally and 27% use backyards refuse pits. Only 31% of the population re-use their waste and 41% make compost. This problem is compounded with the unavailability of a well-established waste management system and sanitary landfills. Recent trends show that there is an increase in the amounts of waste generated in the trading centers of the district.

There are no established sanitary or waste management facilities in the district apart from the ones at the District Hospital and ILLOVO in Dwangwa. The District Hospital has an incinerator where most of the solid wastes produced at the hospital are burnt while ILLOVO has a dumping site at Kasasa for most of the mixed solid wastes from the market and from homes that are biodegradable. The lack of these well-established waste management systems and sanitary landfills leads to land pollution in residential and other areas in the district.

Education

	government	Private	Total
Primary schools	165	9	
Secondary schools	20	5	
enrollment	Boys	Girls	Total
	61,617	62,907	124,524
Drop out rate	6.1%	6.4%	AVG= 6.2%

	ZONE	SCHOOL
1	Boma	Chisoti
2		Nkhotakota LEA
3		St. Pauls
4		Nkhotakota CCAP

5	Chididi	Chia
6		Kayadzi
7	Chiponda	Kamwala
8		Msenjere
9	kabiza	Kabiza
10		Liwaladzi
11		Majiga
12	Kanyenda	Dwangwa
13		Kanyenda
14	Kaongozi	Ngala
15	Kasipa	Kasipa
16	Kasitu	Kasitu
17		khuyu
18	Lozi	Chansomba
19		Chombo
20		Lozi
21	Mkaika	Chibothera
		Chinkhwamba
		Chongole
		matamangwe
	Mpondagaga	Chilumba
		Mpondagaga
	Thole	Kasamba
	walemera	Mpandawadothi
		Msangu
		walemera
		mdyankhanga

Issues raised

- Need to have zebra crossing and speed bumps where schools are
- Need to ensure safety of learners from abuse
- Contribute towards maintenance of schools close to the road to improve outlook
- Construct fences at school very close to the road to protect learners from accidents during construction. Brief the school structures accordingly

Updated data on schools – December 2023

2023 Academic year Enrolment							
NO	ZONE	NAME_OF_SCHOOL	EMIS NO	DEV	TOTAL_	TOTAL_	Total
1	Boma	Chisoti	50053	8	558	592	1150
2	Boma	Nkhotakota CC	50414	8	1018	1137	2155
3	Boma	Nkhotakota LEA	50246	8	997	1084	2081
4	Boma	St Pauls	50414	8	1341	1308	2649
5	Chididi	Chia	50018	8	828	873	1701
6	Chididi	Kayadzi	50122	8	535	545	1080
7	Chipando	Kamwala	50096	8	189	198	387
8	Chipando	Msenjere	50487	8	291	352	643
9	Kabiza	Kabiza	50079	8	514	497	1011
10	Kabiza	Liwaladzi	50135	8	1076	1064	2140
11	Kabiza	Majiga	50423	8	524	511	1035
12	Kanyenda	Dwangwa	50065	8	1627	1578	3205
13	Kanyenda	Kanyenda	50101	8	1916	1882	3798
14	Kasipa	Kasipa	50112	8	412	456	868
15	Kasipa	Phakwe	50256	8	981	1029	2010
16	Lozi	Chanthomba	50293	8	479	424	903
17	Lozi	Chombo	50060	8	583	564	1147
18	Lozi	Lozi	50136	8	772	798	1570
19	Mkaika	Chibothera	50019	8	308	326	634

20	Mkaika	Chinkhwamba	50044	8	552	552	1104
21	Mkaika	Chongole	50061	8	446	401	847
22	Mkaika	Matamangwe	50160	8	950	1092	2042
23	Mpondagaga	Chilumba	50034	8	1099	1010	2109
24	Mpondagaga	Mpondagaga	50199	8	516	534	1050
25	Walemera	Mdyankhanga	50305	8	435	424	859
26	Walemera	Mpandawadoth	50193	8	255	246	501
27	Walemera	Msangu	50201	8	146	155	301
28	Walemera	Walemera	50282	8	516	514	1030

2023-2024 October								
No	ZONE	NAME_OF_SCHOOL	EMIS NO	Sch DEV	Boy Tot	Girl Tot	Grand Total	
					Boy	Girl	Total	
1	Boma	Chisoti	50052	8	596	605	1201	
2	Boma	Nkhotakota CCAP	50412	8	1147	122	2376	
3	Boma	Nkhotakota LEA	50243	8	102	124	2262	
4	Boma	St Pauls	50415	8	129	127	2567	
5	Chididi	Chia	50019	8	866	847	1713	
6	Chididi	Kayadzi	50128	8	612	648	1260	
7	Chipand	Kamwala	50091	8	218	193	411	

8	Chipand	Msenjere	5048 2	8	296	340	636
9	Kabiza	Kabiza	5007 6	8	572	550	1122
10	Kabiza	Liwaladzi	5013 5	8	996	1012	2008
11	Kabiza	Majiga	5042 0	8	559	561	1120
12	Kanyenda	Dwangwa	5006 5	8	157	174	3325
13	Kanyenda	Kanyenda	5010	8	179	183	3633
14	Kasipa	Kasipa	50112	8	476	490	966
15	Kasipa	Phakwe	5025 9	8	987	105	2042
16	Lozi	Chanthomb	5029 6	8	474	458	932
17	Lozi	Chombo	5006 7	8	649	643	1292
18	Lozi	Lozi	5013 9	8	771	770	1541
19	Mkaika	Chibothera	5001 6	8	310	341	651
20	Mkaika	Chinkhwam a	5004 4	8	517	500	1017
21	Mkaika	Chongole	5006 0	8	505	498	1003
22	Mkaika	Matamangw	5016 8	8	992	1157	2149

23	Mpondaga	Chilumba	50037	8	541	576	1117
24	Mpondaga	Mpondagaga	50194	8	505	479	984
25	Walemera	Mdyankhan	50308	8	453	422	875
26	Walemera	Mpandawathi	50194	8	248	239	487
27	Walemera	Msangu	50203	8	190	200	390
28	Walemera	Walemera	50289	8	398	413	811

School Name	TOTAL	TOTAL
NKHOTAKOTA SECONDARY	382	250
BISHOP MTEKATEKE PRIVATE	370	314
BENGA CDSS	136	145
MPONDAGAGA	72	79
NKHOTAKOTA COLLEGE	134	87
LINGA CDSS	408	415
WALEMERA DAY	187	206
LIWALADZI CDSS	156	161
MAJIGA CDSS	141	161
LOZI DAY	192	186
MSENJERE	129	97

Health – Filled by DEHO- Thomsas Mchipha 24th January 2022

<p>1. Number of health facilities at the district and zone along project area (including their names) How many are CHAM hospitals and government</p>	<p>1. Alinafe Community Hospital, (CHAM) 2. Benga Health Center, (GOVT) 3. Kapiri Health Center, (CHAM) 4. Chididi Health Center, (CHAM) 5. Mpamantha Health Center, (GOVT) 6. St. Annes, (CHAM) 7. District Hospital (GOVT) 8. Bua Health Center, (GOVT) 9. Msenjere Health Center, (GOVT) 10. Liwaladzi Health Center, (CHAM) 11. DCGL Dispensary, (Public Private) 12. Matiki Health Center, (Public Private) 13. Nkhunga Health Center, (GOVT) 2. Total: 13 3. CHAM=5 4. GOVT =6 5. Public Private =2</p>
<p>6. Staffing levels of health personnel for the district and for facilities in the project area</p>	<p>1. Alinafe Community Hospital, (CHAM) = 25 2. Benga Health Center, (GOVT) =21 3. Kapiri Health Center, (CHAM) =27 4. Chididi Health Center, (CHAM) =26 5. Mpamantha Health Center, (GOVT) =19 6. St. Annes, (CHAM) =76 7. District Hospital (GOVT) =388 8. Bua Health Center, (GOVT) =17 9. Msenjere Health Center, (GOVT) =19 10. Liwaladzi Health Center, (CHAM) =19 11. DCGL Dispensary, (Public Private) =11</p>

	<p>12. Matiki Health Center, (Public Private) =24</p> <p>13. Nkhunga Health Center, (GOVT) =25</p>
<p>14. Demography trends for the district, and possible, for zones along project area: (fertility birth and mortality rate growth forecast; and pressures/problems associated with demographic trends.</p> <p>a. Mortality (particularly maternal, infant (under 1 year) and among children (under 5 years) morbidity and disability.</p>	<p>15. Demography trends for the district:</p> <ol style="list-style-type: none"> 1. Fertility Rate = 6.0 2. Birth rate =45.29% 3. Mortality rate =9.39/1000 4. Growth forecast (Rate) = 3.15 5. pressures/problems associated with demographic trends: <p>16. a). Increased OPD attendance leading to high consumption of medical supplies</p> <p>17. b). High case load affecting Doctor: Patient ratio as regards the current staffing norms</p> <p>18. c).</p> <p>19.</p> <p>20.Mortality:</p> <ol style="list-style-type: none"> I. under 1 year = 41/1000 II. under 5 years =64/1000 III. morbidity and disability (OPD Attendance) = Total 1656/1000
<p>21. HIV/AIDS epidemiological situation especially among the 14 and 25-34 years' age groups.</p>	<p>22. HIV/AIDS-prevalence (in general: Nkhotakota Positive Rate is at 6.4% with a Prevalence of 7.2%)- irrespective of Age</p> <p>23.</p>
24.COVID-19 statistics	25.
26.Indicators on major health issues in the district and (if available, for the project area.)	<ol style="list-style-type: none"> 1) HIV/AIDS – as above in 15.0 2) Malaria = 691/1000 3) STI = 17.4/1000 4) TB Prevalence rate = 12.6%

	<p>5) ARI = 35%</p> <p>6) Diarrhoeal diseases (under five) = 24.5% and those over five = 42.08%)</p> <p>7)</p>
27. Contact persons present at the health facility in the project area	<ol style="list-style-type: none"> 1. Alinafe Community Hospital, (CHAM) = In - Charge 2. Benga Health Center, (GOVT) = In - Charge 3. Kapiri Health Center, (CHAM) = In - Charge 4. Chididi Health Center, (CHAM) = In - Charge 5. Mpamantha Health Center, (GOVT) = In - Charge 6. St. Annes, (CHAM) = In - Charge 7. District Hospital (GOVT) = In - Charge 8. Bua Health Center, (GOVT) = In - Charge 9. Msenjere Health Center, (GOVT) = In - Charge 10. Liwaladzi Health Center, (CHAM) = In - Charge 11. DCGL Dispensary, (Public Private) = In - Charge 12. Matiki Health Center, (Public Private) = In - Charge 13. Nkhunga Health Center, (GOVT) = In - Charge
14. Anticipated Health Issues for the project area.	<ol style="list-style-type: none"> i. Dust = leading to ARIs including TB, pollution to houses and household items like cloths and beddings, food stuffs and vegetation ii. Noise: = loss of human hearing capacity, distraction of concentration of learning for learners (if near schools), loss of sleep if near dwelling houses leading to increased reproductive health activities which can result in increased population growth iii. Vibrations : Damage to buildings leading to injuries and deaths – causing increased OPD attendance in the facilities near the road construction project

	<p>v. Diversions: leading to loss of vegetation, crops, land degradation leading to malnutrition, malaria (due to swamps created)</p> <ul style="list-style-type: none"> • Unnecessary noise- leading to loss of sleep (insomnia) • Vibrations- leading to cracks of dwelling houses which may result into damages and injuries including deaths; • Road Accidents- leading to injuries and deaths <p>vi. Negative Social Health Impacts: such: STIs, HIV/AIDS, COVID 19, Scabies (Skin Conditions), Diarrhoea including Cholera (especially where construction workmanship has no latrines for defecation),</p> <p>vii. Positive Social Health Impacts: source of temporary employment/income for local communities to improve their living standards.</p>
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Updated health statistics – December 2023

446,006 population

	Prevalence	Incidence	Positivity rate
HIV	5.2%		2.1
Malaria		705/1000	
STI	1.6		
ARI	64% under 5		
TB	58/100,000	61/100,00	
Diarrhea	17.3%		

Tryps

2019	31
2020	25
2021	39
2022	26
2023	17

Health staffing

No.	facility	Nurses	Clinical staff	Environmental staff	Administration	Ground labours	HSAs	Hospital/ patient attendant	Incinerator operator	Mortuary attendant	Other
1	Ntosa	3	1	0	0	2	9	5	0	0	0
2	Benga	3	2	1	0	1	12	5	0	0	0
3	Alinafe	10	2	0	1	5	12	9	0	0	2 Home craft workers
4	Mwansamb	3	2	1	0	2	16	5	0	0	1 Pharmacy 1 Home craft workers
5	Malowa	3	1	0	0	2	12	4	0	0	0
6	Chididi	3	1	0	0	2	9	3	0	0	0

7	Mpamantha	3	1	0	0	2	9	5	0	0	1 Pharm cy
8	Bua	3	2	0	0	1	12	4	0	0	0
9	Nsenjere	4	1	0	0	2	12	5	0	0	1Pharm acy
10	Liwaladzi	3	0	0	0	3	10	4	0	0	0
11	DCGL	1	1	0	0	2	6	3	0	0	0
12	Katimbira	2	1	0	0	1	10	3	0	0	0
13	Matiki	18	4	0	2	6	5	8	0	1	1 Pharm cy
14	Nkhunga	9	2	1	0	2	12	5	0	0	1 Pharm cy
15	Kaongozi	1	1	0	0	1	6	2	0	0	0
16	Ngala	3	2	1	0	1	11	5	0	0	0
17	Kasitu	3	1	0	0	2	8	4	0	0	0
18	Dwambazi	4	1	1	0	2	12	6	0	0	1 Pharm cy 1 Hor craft workr
19	St Annes	36	5	0	1	4	9	8	0	0	2 Home craft workr
20	Kapiri	2	1	0	0	2	16	4	0	0	0

21	District Hospital	97	40	4	1	12	59	64	1	4	3 HPC 1 Nutrit n 2 Auxilia y nurs 6 Home craft work
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Source: Nkhotakota DHO, Healthcare waste management plan 2023

District Cholera Daily Reporting For Nkhotakota

Reporting District:	Nkhotakota		
Reporting date:	8 December 2023		
Reported by:		Phone number:	

Key Statistic Updates:

	Name of Data Element/Indicator	Remarks/comments	
	Cases		
1.	Number of suspected cholera cases	0	
2.	Number of new confirmed cholera cases	0	
3.	Number of new health care workers infected	0	
4.	Number of new confirmed cross border (international) cholera cases	0	
5.	Number of cumulative confirmed cholera cases in the district	1475	
	Contact tracing		
6.	Number of contacts traced in the past 24 hours	0	
7.	Number of cumulative contacts traced	91	
	Admissions		
8.	Number of new cholera admitted in the past 24 hours	0	

9.	Number of cholera cases currently admitted	0	
10.	Number of CTCs/CTUs with active cholera cases in the district	0	
	Discharges		
11.	Number of new cholera cases discharged in the past 24 hours	0	
12.	Number of cumulative cholera cases discharged in the district	1415	
13.	Number of cholera cases absconded	1	
	Deaths		
14.	Number of new cholera community deaths in the district	0	
15.	Number of new facility cholera deaths in the district	0	
16.	Number of cumulative community plus facility deaths in the district	58	
	Tests		
17.	Total number of cholera RDT tests conducted in the past 24 hours	1	

Nkhotakota District Daily Update of COVID-19 Response

Reporting District:	Nkhotakota		
Date of the Report:	8 December 2023		
Reported by:	Lilian Chimbayo	Phone number: 0999134824	

Key Statistic Updates:

	Name of Data Element/Indicator	Responsible Department	Statistic	Remark
1.	Number of new confirmed COVID-19 cases in the district	Surveillance	0	
2.	Number of cumulative confirmed COVID-19 cases	Surveillance	1448	
3.	Number of new case of Health Care Workers(HCWs)	Surveillance	0	
4.	Number of cumulative confirmed case of COVID-19 HCWs	Surveillance	74	
5.	Number of contacts traced in the past 24 hours	Surveillance	0	
6.	Number of cumulative contacts traced	Surveillance	933	
7.	Number of new contacts discharged in the past 24 hours	Surveillance	0	
8.	Number of contacts successfully discharged from quarantine at day 14	Surveillance	933	
9.	Number of new travelers from outside Malawi on follow up in the past 24 hours	Surveillance	0	
10.	Number of cumulative travelers from outside Malawi in the district	Surveillance	72	
11.	Number of cumulative travelers discharged from quarantine at day 14	Surveillance	72	
12.	Number of new COVID-19 cases admitted in past 24 hours	Clinical	0	
13.	Number of COVID-19 cases currently admitted	Clinical	0	

14	Number of cumulative admissions of COVID-19 cases in the districts	Clinical	123	
15	Number of new COVID-19 cases discharged in the past 24 hours	Clinical	0	
16	Number of cumulative cases discharges	Clinical	88	
17	Number of new re-admissions	Clinical	0	
18	Number of cumulative re-admissions	Clinical	1	
19	Number of active COVID-19 cases on self-isolation	Clinical	0	
20	Number of new COVID-19 cases in institutional-isolation	Clinical	0	
21	Number of COVID-19 cases currently in institutional-isolation	Clinical	0	
22	Number of cumulative COVID-19 cases on institutional-isolation	Clinical	70	
23	Number of new COVID-19 recoveries	Clinical	0	
24	Number of cumulative number of COVID-19 recoveries	Clinical	1394	
25	Number of new lost to follow up	Clinical	0	
26	Number of cumulative lost-to-follow-up COVID-19 cases	Clinical	0	
27	Number of new transfer out	Clinical	0	
28	Number of cumulative transfer out	Clinical	0	
29	Number of new transfer In	Clinical	0	
30	Number of cumulative transfer In	Clinical	9	
31	Number of new community deaths (confirmed/probable COVID-19) in the district	Clinical	0	
32	Number of cumulative community deaths (confirmed/probable COVID-19) in the districts	Clinical	8	
33	Number of new COVID-19 deaths in the district	Clinical	0	
34	Number of cumulative COVID-19 deaths in the district	Clinical	39	
35	Number of new COVID-19 cases that are pregnant	Surveillance	0	
36	Number of active COVID-19 cases that are pregnant	Surveillance	0	
37	Number of cumulative number of COVID-19 cases that were pregnant	Surveillance	21	
38	Total number of COVID-19 tests conducted in the past 24 hours	Lab	0	
39	Total number of GeneXpert test conducted in past 24 hours	Lab	0	
40	Total number of GeneXpert tested positive in past 24 hours	Lab	0	
41	Total number of AgRDT tested conducted in past 24 hours	Lab	0	
42	Total number of AgRDT tested positive in past 24 hours	Lab	0	
43	Total number PCR test conducted in past 24 hours	lab	0	
44	Total number of PCR test positive in past 24 hours	lab	0	
45	Total cumulative GeneXpert test conducted up to date	Lab	290	
46	Total cumulative AgRDT test conducted up to date	Lab	8208	
47	Total cumulative PCR test conducted up to date	Lab	0	
48	Total number of COVID-19 samples shipped to another lab in the past 24 hours	Lab	0	
49	Cumulative COVID-19 samples shipped to another lab	Lab	178	

A2.2.2.1 District Stakeholders' Workshop Minutes

DISTRICT STAKEHOLDERS' WORKSHOP

Dates: 29th and 30th November

Venue: District Water Office Boardroom

Note-taker: Lilian Lucus

PRESENTATION 1: Road design and related issues (Isaac – engineer)

- The road designs were done by different consultants other than Kandoli Consulting Engineers. Kandoli-AESL JV as ESIA and RAP consultants have had access to the designs.
- According to the drawings provided by the client the stretch between Benga and Dwangwa has 20 road. Of the 20 road, 16 will have new road constructed and 4 road will be retained. Of the 16 new road the scope involves replacing the narrow single lane old road with new wide double lane road. Table below gives the details

Bridge	New bridge to be constructed	Retained
Bua		✓
Chamachete	✓	
Chamakuwi	✓	
Chia		✓
Chizeu	✓	
Dwangwa		✓
Kanjamwana	✓	
Kaombe	✓	
Kasangazi	✓	
Khako	✓	
Ling'ona	✓	
Liwaladzi		✓
Lunga	✓	
Mikongwe	✓	
Misenjere	✓	
Mnchandire	✓	
Navunde	✓	
Saliwona	✓	
Tipati	✓	
Walemera	✓	

- The existing old running surface will have removed and replaced by a new one. A typical cross section of the new road will be 9.7 meters. This comprises of 3.35m lanes in both opposite directions and 1.5m shoulders on each side. The running surface is currently designed to be double bituminous surface treatment (DBST) of 19mm and 9.5mm aggregates. The drainage system of the road will also be upgraded. However, all this information and designs are not final as the Client (Roads Authority) might engage a design review consultant who might bring alterations.
- **COMPLAINTS TO THE DISTRICTS COUNCIL**

- The Mota-Engil mobilized and commenced the works under the previous contract. They consequently took down some people's trees and structures without compensation. The property owners frequent the District Council Land Office for help. How is the issue going to be resolved?

Response: Since we as an ESIA and RAP review consultant, are not privy to what transpired on a different contract other than ours with the client, such a question is best referred to the client.

- Since Mota-Engil contract with Roads Authority was cancelled who is going to assure the complainants that they will be compensated?

Response: The Roads Authority is best suited to give such assurances.

- There is a risk of the new contract being jeopardized if the issue of the complainant on the Mota-Engil are not assisted beforehand, because they affected people have vowed not to allow works to proceed without their concerns being addressed

Response: Just to repeat, the Roads Authority is best suited to handle and give comprehensive responses on this issue. However, as an ESIA and RAP review consultant we will record the complaint and present to Roads Authority.

PRESENTATION 2: Environmental and social impacts plus mitigation/enhancement measures (ESIA team)

[from ESIA Report]

COMMENTS & DISCUSSIONS

	Comments/Issues Raised	Response/recommendations
	Who gives the contract to the ESMPs ? and what should be done?	Monitoring implementation of reinforcement of ESMP
	No grievance were shown in the presentation as they should be a structure of the council	They should be a specific committee for this particular project (resettlement working group) this should involve a person from council, village, from the Road Authority and the project itself.
	Where do the people working on this project build their toilets and where do they dispose their waste?	The contractor has the toilets within the campsite and the waste is dumped in dumpsites. Nkhotankhota and Dwangwa have a dumpsites though they have not started functioning.
	Due to incoming of this project the girl child will be exposed to getting early pregnancies	Sensation in schools especially to the girls on how to handle themselves during this particular time.
	Compensation should be paid before the beginning of project	Adequate sensitization so that only Project Affected Person claim for compensation.
	Most projects dig borrow pits and leave them behind without covering them, this has come to our attention that now Nkhotankhota has a lot of borrow pit	Beware that the district council has the power to stop the construction work if these borrow pits are not covered
	Barrow pits when left unattended during rainy season retain water which later become breeding grounds for mosquitoes	The contractor should be forced to cover the barrow pits to avoid diseases.
	When the contract is being signed they should be the face of the district council and fully involve the land office	The road authority to use the right channel or proper procedures before compensating the community members, they need to inform and address people on the whole

		project by also going through the right before any process.
	The project should increase social amenities, the camp site should be belt Permanent as it is part of government hinge ring its part of mobilization	
	Once a tree has been cut down it should be replaced, or is there a provision for cover for this?	For a every tree that has been cut down should be replaced with ten seedlings to be planted on other areas
	Resource should be provided to the council once they invited them to any meeting, workshop and in monitoring for instance transportation	
	Most boreholes are along the road these exposing to being destroyed and some becoming hazardous, what measures are you going to take are they are sources of water for people?	Anything in diversions will be seriously looked into and the boreholes should be replaced before the beginning of the project
	In the presentation there was no budget for drainages, does that mean the road will have no drains?	The drainage systems will be there according to the sketch that will be used by the contractor

PRESENTATION 3: Environmental & Social Settings (ESIA team)

[from ESIA Report]

WORKING SESSION: topic-specific analysis of gaps, changes and anticipated changes using the matrix below (all stakeholders present).

Area of focus	Gaps/changes/anticipated changes	recommendations
climate change	<ul style="list-style-type: none"> ➤ There strong winds and drought in Mphonde, Linga and Zidyana every year ➤ High levels in the lake 	<ul style="list-style-type: none"> ➤ Implementing measures such as improving the drainage systems
Hydrology (drainage systems)	<ul style="list-style-type: none"> ➤ Sensitive habitants ➤ Consideration of the drains to were the water will be directed ➤ Since the design of the M5 does not include enough drainage structures to handle the excess water brought on by the increased rainfall intensities experienced over 	<ul style="list-style-type: none"> ➤ Control the water flow through the drains ➤ Know the areas that these trends usually occur (sensitive areas) ➤ Checking streams that are directed into the rivers

	the past ten years or so, the M5 currently functions as a drainage obstruction to both surface and subsurface water flowing from the escarpment to the lake.	
sensitive habitats	<ul style="list-style-type: none"> ➤ Hot springs ➤ Musenjere river which has too many crocodiles has no diversion ➤ Mwadzama is one of the sensitive habitat after Vyovo Kasime ➤ They is sensitive road (ADMARC Kaphiri) and MBC Benga ➤ Overuse of resources and pollution ➤ use of destructive fishing gear and methods 	<ul style="list-style-type: none"> ➤ sensitization to the community of overuse of resources and pollution ➤ implementing strict environmental regulations and promoting sustainable consumption
Land tenure and land use	<ul style="list-style-type: none"> ➤ Rice is mostly cultivated along the drains of the road ➤ Trading centers in Nkhotankhota are along the road all around the area ➤ Most primarily schools are 30 M away from the road but for safety sake for these children they should keep more signs when the project is in progress 	<ul style="list-style-type: none"> ➤ Zone regulation, implement and enforce zoning laws to allocate land for specific purposes, preventing incompatible land uses in certain places
Agriculture	<ul style="list-style-type: none"> ➤ Mphonde has no pigs but all other EPAs has pigs ➤ Floods experienced along major rivers in all EPAs and Rainfall sometimes is associated with hailstorm wind but not intensive ➤ African Army worm have become a natural disaster affecting most crops in Nkhotankhota ➤ Green maize is a cash crop in all the EPAs 	<ul style="list-style-type: none"> ➤ Implement effective early warning systems to provide timely alerts to the community ➤ Invest resilient infrastructures, such as ka proper drainage system, levees, and flood barriers, to manage and divert water during rainfall ➤ Community awareness by educating local farmers about armyworm identification, monitoring

		<p>and control armyworm outbreaks at a large scale.</p> <p>➤</p>
Planned development activities (include changes in basic infrastructure)	<p>➤ The hospital paying wing is now functioning</p> <p>➤ The electronic gadgets in markets are now functioning</p> <p>➤ In development plan the local should be able to participate in some festival which are engaged by the council by USA</p>	<p>➤ Pattern ship with different stakeholders as it can help in reconstructing and strengthening the community and the council</p>
Education	<p>➤ There few schools in our district which usually cause pressure and due to this most students drop out of school</p> <p>➤ Most schools are far from different communities this forcing students to walk long distances to get to school</p>	<p>➤ The project should bring in new schools to the community</p>
Health	<p>➤ There some diseases that are now affecting people in this district for instance Cholera, Trypanomiosis and Scabies</p> <p>➤ increased cases of malaria as a result of water ponding created by construction activities</p> <p>➤ increased injuries and accident cases by construction works</p> <p>➤ increased cases of diarrhoea resulting from poor human waste management at campsite and construction sites.</p> <p>➤ increased OPD case load on health facilities that are already experiencing pressure due to low staffing levels.</p> <p>➤</p>	<p>➤ Collaboration between healthcare providers, the council and community members to maintain good health outcomes.</p> <p>➤ establishing community health programs</p> <p>➤ Introduce more Health Surveillance Assistance in the community</p>

Employment & Labor markets	<ul style="list-style-type: none"> ➤ They are potential areas in the game reserve that are open for employment ➤ The fishing industry is highly informal ➤ The energy sector (the Selengeta solar Farm) along the M18 Kasamba Farm and the Votalia energy sector in Dwangwa, these are potential for open employment 	<ul style="list-style-type: none"> ➤ To help community members to be hired in these places
Sources & distribution of income	<ul style="list-style-type: none"> ➤ 	
Historical sites	<ul style="list-style-type: none"> ➤ There shall be no tampering with historical landmarks or areas where slave marketplaces were located. 	<ul style="list-style-type: none"> ➤ Community engagement, by developing involvement of local communities in preserving processes and by encouraging sense of ownership and pride ➤ Tourism management,
Cultural environment	<ul style="list-style-type: none"> ➤ some of the teachings considered to promote promiscuity among the initiates resulting in increased school dropouts, early pregnancies and HIV infections, for instance practices of Chinamwali and Jando ➤ Chieftain succession follows the blood line of a woman; ➤ Non Malawian are big business hub, as it was noted when these Non Malawian were chased the businesses stopped and when the government stopped chasing them the businesses were back to normal by the same Non Malawians 	<ul style="list-style-type: none"> ➤ Starting some peer support programs in schools to facilitate these boys and girls the sense of belonging ➤ Sensitizing parents, this by encouraging their parental participation in their child's education to create supportive environment at home

PRESENTATION 4: Resettlement Action Plan (RAP)
[from RAP Report]

COMMENTS & DISCUSSIONS

	Comments/Issues Raised	Response/recommendations
	People are building houses along the road knowing they is the coming of the road in order to get compensated	
	The reserve road boundaries does they only apply to the main road?	<ul style="list-style-type: none"> ➤ For the district main road, it yes as it is 30M from the center line ➤ The Road Authority through the DBW are working together to maintain the road
	Who is to select the Resettlement Working Group into existence?	<ul style="list-style-type: none"> ➤ The Road Authority ➤ This committee is to overlook all grievance cases that are even brought to the council
	If the RWG fails to handle that particular cases, what happens?	
	Informing the roads authority to be working hand in hand with the RWG	<ul style="list-style-type: none"> ➤ The Resettlement Working Group has to have a member in the committee so anything to be discussed in it the road authority should be aware of it and they should know all the procedure
	Feeder roads should be fixed as during diversion they should be in good condition	<ul style="list-style-type: none"> ➤ Feeder roads to be at least 20M from the main road shall be considered ➤ DBD to identify the feeder roads in the areas
	Road authority to be communicating rather than people working in assumptions and take these issues to them to look up to them before the project begins	
	From the beginning of the project the consultant works with the council but when they met the Roads Authority they say they have not budgeted for it	
	Issues meet during the construction not the road are brought to the council but the project claim to have no budget for it as they deal with the road authority	<ul style="list-style-type: none"> ➤
	<ul style="list-style-type: none"> ➤ Consultant problem of borrow pits, they get land from a community member promising to pay them later which they end up not paying them and not even covering them ➤ Contractor making contacts with people in village, making them sign 	<ul style="list-style-type: none"> ➤ Through the council (DBW) you can call the roads authority like the borrow pits ➤ The rehabilitation will go to the land
		<ul style="list-style-type: none"> ➤ Dwell on the activities that are being done and stress to get those contracts

		from the contractors that they assigned with community members ➤ Demand your tools, RAP and ESMPs, if they do not have stop the project
	The Chinese company failing to clean the environment as the roads are even all dusty and a tank full of waste	
	How are you accommodating CASOs in this project?	
	Too many existing borrow pits by contractors who never fixed them	

A2.2.3 KII with Nkhotakota Youth Director

NAME & TYPE OF Interview: *KII (Mr Masoakhumbira)*

DATE: 21 – January- 2022

FACILITATOR: Madalitso Chimombo

NOTE TAKER: Chimango Mtekateka

About the project

Which T/As, sub-T/As and GVHs does the road section fall in? What is the number of households for each GVH mentioned?

- T/As
 - i. Mwadzama
 - ii. Malengachanzi
 - iii. Mphonde
 - iv. Kanyenda

What do you know about the project? (Observe and record general reaction.)

- Reaction – Positive altitude
- Aware that the road will be rehabilitated

How important is the road to the surrounding communities?

- The Road is used for Transportation of Goods
- Used in businesses for reaching various locations including

Noted out of context: Challenges caused due to current status includes; loss of business properties by theft caused by breakdown of trucks mostly when transporting of sugarcane which most times is a result of poor condition of the road

How will the rehabilitation of the road affect the people and the natural environment?

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure
A1	Increased employment opportunities especially for the youth in forms of manual labour or Ganyu	Assigned contractor should employ labourers from Nkhotakota
A2	Restoration of hope to have a good road always	
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	Easy movement or transportation of products and saving time at the same time because good road condition reduces the impact slowing down due to pot holes	
B2	Reduced accidents due to the good road condition where lanes will be enough for both vehicles and other road users	Putting up road signs to enhance traffic reduced rate of accidents
B3	Increased business opportunities because good road promotes trade	

NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure

A1	Increased cases of Early pregnancies	City council should provide community sensitization campaign. But also mass sensitisation among peers may help reduce the cases of early pregnancies. Contractor should provide child protection guidelines to acknowledge and sign
A2	Spreading of sexual transmitted diseases may increase including the spread of HIV	Sensitisation campaign about abstinence
A3	Demolition of houses and shops along the road	The people should be given time to relocate and also compensations must be considered for them to re-establish
A4		
Operation phase		
B	Negative Impacts	Mitigation Measure
B1	<p>Road accidents may arise because of the following reasons;</p> <ul style="list-style-type: none"> • Ignoring speed limit signs on the road (Over speeding) because excitement since the road is in good condition • Wrong use of the road such as spreading drying of food products on the road (cassava) 	Putting up road signs and sensitizing community members on the proper use of the road.

Who will benefit more from the project at both construction and operational phases, between men and women, boys and girls, the young and the elderly? How?

Youth will benefit more – men and youth,

How; because construction work requires masculine workers

- a. Who will be affected more by the negative impacts of the project? How?

General information

Ethnic: Chewa, Tonga

Languages Chichewa, Tonga, Swahili

Traditional dances: Gule wamkulu, Malipenga, Canada, Makhanya

A2.2.4 KII with Nkhotakota Game Reserve Park Manager

NAME & TYPE OF KII: Interview with Park Manager Nkhotakota game reserve

DATE: 21 – January- 2022

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure
A1		
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	Increased tourism, thus the number of tourists visiting Nkhotakota game reserve may increase since the road is in good condition. It will also enhance people to invest in the tourism sector	
B2	Easy mobility among staff member, staff that resides outside game reserve will be travelling easily and on time due to reduced potholes on the road which reduce mobility on the road	
B3	Increased population and opening up of new trading centres along the road	
B4		

NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure

A1	Soil Erosion which will affect fish disturbing their habitats and spawning zone	Do not extract gravel inside park and avoid unnecessary cutting down trees, cutting down of trees should only be done when its necessary <i>Agriculture and fisheries department should be consulted on Mpa breeding site as these departments are also involved in management of various resources such as rivers and fish resources</i>
A2	Increased market for poachers, since many people will be coming to work on the road during construction	
Operation phase		
B	Negative Impacts	Mitigation Measure
B1	The road will increase visual for wildlife animals as they will be able to see from far	Avoid cutting down of trees unnecessarily to maintain vegetation coverage.
B2	Human activities will increase such activities include charcoal burning and wood sourcing on regenerating forest since they can be easily transported to other locations	Do not take or leave anything inside outside park that will affect the environment.

8. Natural Resources

- Dwambadzi forest reserve
- Vizala rubber forest
- Wildlife Assets – Buffalo, Leopard, Elephants, Bushbuck, waterbuck, Zebra, eland, Rone antelope, Baboons, Blue monkeys, crocodiles
- Mpasa fish – have endangered habitat at bua river

- Tree species, Jupenadia, combretums Miombo (blackstigia), Mahoganny, terocapasis,
- Birds Tita falcon, the game reserve is recognised as an international bird watchers and has over 280 bird species, and this makes the game reserve to be important bird area for breeding among other factors.
- Minerals – gold along bua river both east and west of the river, riwale and dwangwa river also possess the minerals
- Chia lagoon – is under fisheries department but is experiencing more soil deposition which is resulting into siltation of the lagoon

Legal framework

Bird treaty, wildlife management act

Mammal list for Nkhotakota

1	African buffalo
2	African civet
3	African elephant
4	Baboon
5	Blue monkey
6	Burchell's zebra
7	Bush pig
8	Bushbuck
9	Cape clawless otter
10	Cape porcupine
11	Common duiker
12	Egyptian mongoose
13	Eland
14	Elephant Shrews
15	Greater kudu
16	Grysbok
17	Honey badger or ratel

18	Impala
19	Klipspringer
20	Leopard
21	Mongoose (Dwarf)
22	Reedbuck
23	Sable
24	Scrub hare
25	Serval
26	Side striped jackal
27	Slender mongoose
27	Smith's bush squirrel
29	Southern tree hyrax
30	Spotted hyena
31	Spotted-necked otter
32	Velvet monkey
33	Warthog
34	Waterbuck
35	Zebra
36	Roan

Note that the following once occurred in Nkhotakota and some went locally extinct a few years before AP took over management in 2015:

Lion, Wild dog, Hippo, Black Rhino, and Puku

Nkhotakota Wildlife Reserve Association (NWIRA) is a structure set up as an association to represent communities around Nkhotakota game reserve which in turn collect credits from game reserve and are funded also by carbon trading from Nkhotakota game reserve

A2.2.5 KII with Director of Nkhotakota Wildlife Reserve Association (NAWIRA)

Interviewer and note-taker: David Mtekateka

DATE: 5th December 2023

- Nkhotakota Wildlife Reserve Association was founded in 2013 and is in four district, namely: Nkhotakota Ntchisi, Kasungu and Mzimba
- It operates through VNRMCS at village level and zone committees at T/A level
- Zone chairs are members of the association
- Association's operations focus on
 - Afforestation through tree planting and forest regeneration campaigns
 - Economic empowerment through promotion of climate smart agriculture, seed multiplication initiatives and livestock pass-on schemes
 - Promotion of human – animal/plant friendly practices
- The proposed project, when implemented, it will easy mobility for association members thus increasing community accessibility
- The road construction will affect a 5km M5 road stretch that passes through NWR area (Navunde Area) which may result in the scaring away of animals or increased cases of human-animal conflict (animals breaking out of fence into communities) since the noise from construction works may irritate some animals
 - Need for the proponent and contract to liaise with NWR to move big animals away from project area during construction works
 - Conduct community awareness through NAWIRA structures in surrounding communities of possible animal breakouts
- In addition, construction works will contribute to deforestation and soil degradation
 - Filling up of barrow pits after excavation
 - Supporting VNRMCS's afforestation activities through provision of materials like seedlings and relevant implements

A2.2.6 KII with Officer-in-Charge, Nkhotakota Police Station

Interviewer & Note-taker: David Mtekateka

DATE: 6th December 2023

The Benga-Dwangwa M5 road stretch falls under Nkhotakota and Dwangwa police stations:
Bua Bridge is the boundary for the police stations:

Structures falling under Nkhotakota police units are as follows

- Mpondagaga police unit
- Kaombe Roadblock
- Mkaika police unit
- Mkaika Police Mobile Service reserve camp
- Benga Police Unit

Community structures working with the police include community policing forum at T/A and GVH level and Community Victim Support Units (CVSU) at T/A level.

Common crimes associated with project area are general theft of crops and personal items like phones mainly due to unemployment, poverty and food insecurity issues

Civil cases usually involve land related conflicts among family members and handled by chiefs; police are involved when the conflicts result in violence or threat of violence

Other civil cases are domestic in nature which are handled by CVSU mostly involving women reporting men for not providing child support, husbands abandoning wives and also causing bodily harm. Men don't usually report when they fall victims of gender based violence or abuse

Anticipated issues that may come with the project:

- Disruption of construction works by individuals or communities dissatisfied with the compensation issues
 - All completes need to be addressed before construction works
- Theft of construction sign posts
 - Ensure proper coordination between project and police
 - Community awareness on their role in protecting and caring for public infrastructures

A2.3Community Level Consultations

A2.3.1 ADC Focus Group Discussion

FRIDAY 21ST January, 2022

TA: Malengachanzi

Name and type of FGD/KII: Nkhotakota ADC

About the project

1. What do you know about the project?

- Have heard of the project a long time ago through social media. But the information stated that the construction will begin from Balaka all the way to Nkhatabay.
- Heard from MP's through political rallies that there will be the construction of the road but not did not state when the project launches.
- Through newspapers and social media.

2. Which T/As, Sub-TAs and GVH's does the road section fall in? What is the number of households for each GVH mentioned?

- **TA: Kanyenda**
 - GVH's: Pikapika, Aaron (Senior group), Sinde and Mbuluma in Chizeo, Maluma, Chia and Katapila around Walemera, Matelezi and Tito around Chamlandu area, Longwe in Liwaladzi, Mbeliphaso and Chimtumbuka at Vitekete, , ng'ongo around Mikongwe bridge, Mbuna Dwangwa Tradin center, Nkhunga and Kanyenda.
- **TA: Malengachanzi**
 - **GVH's:** Vinthenga, Makuta, Ng'oma, Kamange, Ntenje, Mbaluku, Malengachanzi, Kawelama, Chota, Chiutula, Chinthumbwi, Chamba, Nkhandwe.
- **TA: Mphonde**
 - **GVH's:** Pendwe, Mvula, Chintambo, Mphonde, Chiboko, Selemani, Ntonya, Ntumbula, Petro Duwa.
- **TA: Kalimanjira**
 - **GVH's:** Kalimanjira, Ntanga 1 and 2, Chikho, Mkombe.
- **TA: Nkhanga**

- **GVH's:** Chongole, Chiko, Ngwata –Matamangwe kapiri ADMARC.
- **TA: Mwadzama**
 - **GVH's:** CHilupula, Bango, Kabyanga, Chioza, Nkhala, Benga1, Chakaka.

Note:

Benga 2, Funsani and Chiaka These GVH's are within TA Mwadzama however the project does not cover them.

3. How important is the road to the surrounding communities?

50.Tourism

- a. There is game reserve and beautiful scenery around the area which attracts visitors regardless of the current state of the road.

51. Health

- a. Transporting patients to main hospitals outside this area is made possible.

52.Business

- a. Transportation of different good and commodities to different destinations as well as markets for business people.
- b. Transportation of fresh perishable products made easy and the products reach far and wider area in the country.

53.Transportation

- a. Links passengers from the Illala, from sea to land.
- b. Transporting of farm products: the area a major producer of Rice, fish, Cassava, Tobacco, vegetables and sugarcane to all parts of the country.

4. How will the rehabilitation of the road affect the people and the natural environment?

a. Positively – construction phase

- Employment opportunities for people in the area.
- People will benefit in terms of trade causing business to thrive.
- Money flow will improve thereby improving the economy of the area.
- Marriage opportunities.
- On a positive angle some marriages with be strengthened.
- Compensation benefits.
- Community interconnectedness.

- After construction phase the structures and buildings that were erected by the construction company shall be used by the community.
- Allows small businesses to bring their products to the construction site and make sales.

i. What can be done to maximise these benefits?

- **Employment:**
 - There should be a link between the labour office and the contractor's policy on employing people.
 - Written and formal contracts from contractors.
- **On compensation:**
 - Early compensation to be addressed before work commences to avoid conflicts and unnecessary grievances.

b. Positively – operation phase?

- Travels made faster to destination and business people will make their orders in time.
- Less accidents due to better roads and road signs.
- Improved businesses due to the coming in of new investors.
- The road will also add beauty to the region.
- Less wear and tear to vehicles making cars last longer than currently.
- Better road transport vessels such as coaches will now be able to use the road, since currently no coach busses use the road.
- Tourism business will improve.

i. What can be done to maximise these benefits?

c. Negatively – Construction phase.

- Increased HIV/AIDS and COVID-19 cases around the area.
- Loss of biodiversity.
- Marriages dissolving and ending ungracefully.
- Unplanned pregnancies.
- Children drop out of school for the interest of watching machines at work.
- Increased in pollution: from dust, oils and fumes causing health related problems.
- Businesses will crumble due to lack of compensation benefits.

i. Mitigation. What can be done to address these challenges?

- **On HIV/AIDS and COVID - 19:** Sensitization to be carried out guided by the leaders in the area and the contractor.
- **On loss of biodiversity:** the project should identify areas where they have to replace the trees and animals they disturb.
- The project must contain tree planting activity
 - **Case study:** In 1983, from Kaphatenga to Benga road construction, the contractor excavated mud to use on the road right close to the Parish before the Police and the depot on the right hand side as you come from Kaphatenga there is a huge basin where water ponds creating a breeding ground for mosquitos and harbouring dangerous animals. Hence since 1983 the hole is still existing.
- **On pollution:**
 - Periodically use of the water bowser to prevent dust from affecting peoples safety and health.
- **On ending marriages:** Sensitization meetings to alert the community that this change is only temporal and they must not be coerced and tempted.
- Contractor must be put under strict laws and elect by-laws in promoting work place committee.
- Training on how to prevent unprotected sexual intercourse, by involving other stakeholders.

d. Negatively – operation phase.

- Theft of government property such as road signs.
- Unemployment increase due to loss of jobs after the job is done.
- Increased in accidents due to over speeding.
- Orphaned children left uncared for.

i. What can be done to address these challenges?

- **On theft:**
 - Establish by-laws and policies and enforcing stiffer punishments on whoever is found with stolen government property.

- **Accidents:** there has to be a clear signal indicating road reserve boundaries and there also has to be a side walk for pedestrians wide enough.

SOCIO ECONOMIC AND GENDER PROFILES

5. If you were to rank the community members into three wealth categories (Rich, poor and ultra-poor) how would they compare in the areas of food, housing, source of income and assets.

- Every person will benefit.
 - (Every person has their own level of benefit ranging from children who will use the road when going to schools, business people as well as the every person including the elderly when seeking hospital care and treatment will also use the road.

i. Most affected:

- **The youth especially girls**
 - Prone to getting early and unplanned pregnancies leading to dropping from school.
- Women.

6. What are the ethnic groups in the area and their languages?

- Chewa, Tonga, Tumbuka, Yao, Ngoni, Sena, Lhomwe, Ngonde

Basically they said all ethnic tribes are present in Dwangwa and the most spoken language being Chichewa.

NB:

The languages mostly spoken is Chichewa which is also true for all TA's

7. What kind of agriculture/farming is there?

Crops:	Livestock
• Sugarcane	• Ducks
• Rice	• Chickens
• Cassava	• Pigs
• Maize	• Goats

•	• Cows
•	• Kalulu the hare
•	• Sheep
•	• Guinea fowls)(Nkhanga)

8. Are there existing business groups (farm clubs, VSL's cooperatives etc)

- Existing groups are available and functional. For example:

9. What type of latrines do most households / this trading center use?

- Roofed pit latrines

a. Dispose of wastes:

i. Domestic or household waste.

- The ADC promoted the area to have dug pits for their garbage disposals.

ii. Market centre waste (Municipal).

- There is no permanent structures of place for dumping wastes as a result waste is dumped using some open space and burning.

iii. Sewage.

- The hospitals sewage system is destroyed

10. What kind of natural resources are available in the area? Right to use

Forests:

- Smallholder forest that was provided by and organisation called WESM through FDH bank.
- Kasasa (Chisita) forest
- Kadya mauni forest

Animals present:

- Monkeys
- Birds
- Snakes (Python, black mamba, adder and green snakes just to mention a few.
- Gwape

- Insa

Natural resources right to use

- **Water** – Free to use
- **Animals** – Not free to use
- **Minerals** – Not free to use
- **Land** – Free to use

11. What radio/TV stations do many people listen in the project area?

Radio	Television
• MBC	• Mibawa
• Ufulu	• Rainbow
• Umunthu	• Times
• ZBS	• ZBS
• Nkhotakota	• MBC
• Times	

12. What is the main mode of transport as of now (and associated costs) to the nearest major trading centres and district centres?

- Use small cars
 - K 3000.00 to Dwangwa (Sienta)
- Motor bike:
 - K4000.00

6. What type of community structures are available in this area?

Community structure committees/groups	Total	No. of Women	No. Men	No. of Youth		No. of PWV	very effective -1 effective -2 ineffective -3	Remarks
				Females	males			
ADC Malengachanzi ADC	60	24	30	0	1	1	1	This information is all true and applies to all TAs, however, the effectiveness of the ADCs only demonstrated when there is a program or project in the area.
Mphonde ADC	45	8	8	10	16	1	2	
Kalimanjira ADC	33	12	21	0	3	1	1	
Kanyenda ADC	78	18	60	9	36	3	1	
Mphonde ADC	63	19	44	8	8	1	1	
Mwadzama ADC	40	13	27	3	4	2	1	
VDC								

Agriculture (Specify)							
Community structure committees/groups	No. of Women	No. of Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective -3	Remarks
			Female	Males			
Seed multiplication groups							

7. Which organizations are operating in this community?

CBO's, FBO's, NGO's	Target group	Activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
Agriculture (specify)						
NASFAM	Farmers	<ul style="list-style-type: none"> • Provide seedlings and fertiliser • establishing Demonstration fields for rice, maize etc • Training on agri-business 		✓	2	
DAPP	Farmers	<ul style="list-style-type: none"> • Trainings on conservation agriculture. Provide seedling and tree seedlings 				
EVANGELICAL ASSOCIATION MALAWI	Farmers	<ul style="list-style-type: none"> • 				

CBO's, FBO's, NGO's	Target group	Activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
FARMERS HOPE	Farmers	<ul style="list-style-type: none"> • Provide seedlings • provide Livestock such as pigs and chicken. 			2	
Environmental (specify)						
WESM	Community	<ul style="list-style-type: none"> • Provide tree seedlings • Provide training on care for trees 			3	
RIPPO AFRICA	Women	<ul style="list-style-type: none"> • Kugawa mbaula 				The organization is still in its early stages and has not been fully established
C-QUEST CAPITAL	The community	<ul style="list-style-type: none"> • Provide nsungwi seedlings • Training on care of Nsungwi 		✓	2	
Water (specify)						

CBO's, FBO's, NGO's	Target group	Activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
KUMUDZI KUWALE	Community	<ul style="list-style-type: none"> • Provides portable water • Drill boreholes and protect shallow wells • provide training on fixing boreholes 		✓		
PARTNERS IN HOPE	Community	<ul style="list-style-type: none"> • Provide safe portable drinking water 				
Health (specify)						
YOUTH COD	Hospitals	<ul style="list-style-type: none"> • Drug management and tracking • Drug use in hospitals • HIV/AIDS counselling 				
PARTNERS IN HOPE	Hospitals	<ul style="list-style-type: none"> • 				

CBO's, FBO's, NGO's	Target group	Activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
RED CROSS	The community	<ul style="list-style-type: none"> • COVID-19 Vaccination administration • Preparedness for cholera outbreaks • Disaster preparedness 			2	
Catholic Commission for Health	Community	<ul style="list-style-type: none"> • HIV/AIDS counselling • Promotion of community health 				
Education (specify)						
MESIP	Schools	<ul style="list-style-type: none"> • Provide resources for schools 			1	
CAMFED	Girl children	<ul style="list-style-type: none"> • Bursary fees 			1	

CBO's, FBO's, NGO's	Target group	Activities	Use Communi based facilitato	Use commun Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
UNICEF	Schools especially t girl child	<ul style="list-style-type: none"> • Providing bursary • Provides school uniform children •Construct structures 			1	
Girl/women empowerment (specify)						
UMUNTHU PLUS	Girls	<ul style="list-style-type: none"> • Construction of girl toilets •bursary for girl school fees •Provide desks 	✓		2	
Civil rights and protection of vulnerable groups (specify)						
NICE	The community	•Loans				
Microfinance						
VISION FUND	The community	<ul style="list-style-type: none"> • Loan services • Business training 			2	
DAPP	The community	<ul style="list-style-type: none"> •Provide loans •Business training 			2	

CBO's, FBO's, NGO's	Target group	Activities	Use Communi based facilitato	Use commun Volunteers	PWDs <i>Very effective</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
MICROLOAN	Everyone in t community especially women	• Provide loan			2	
Other business-oriented organizations (specify)						

A2.3.2 Mkaika Focus Group Discussion with Men

Socio-economic profiling and gender assessment (community fgd)

Ta: mwadzama

Gvh: Bango

Name & type of FGD: Mkaika men's FGD

Date: 22nd January, 2022

About the project

9. What do you know about the project? (Observe and record general reaction.)

-

10. How important is the road to the surrounding communities?

- Easy mobility to the hospital
- Transporting business produce
- Transporting basic needs from different areas to Mkaika
- Both government and people benefit from the road since the sugar factory uses the same road
- Cars from Dar-es-salam travel through the same road.

11. How will the rehabilitation of the road affect the people and the natural environment?

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure
A1	Local people will get employed by the construction company	Government labour laws
A2	Reduction of road accidents	
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	Reduction of accidents	-Put section for people to pass -Road signs -Humps

NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure

A1	Demolishing of buildings in the RRB	Civic educating the community not to build in the RRB
A2	Soil structure disturbed	Approach the owner of the land where the soil is being extracted Compensating the owner
A3	Trees along the road cut down	Replace the trees and compensating the owner of the trees
A4	STIs and HIV Teenage pregnancy	Civic educating them
A5	Burrow pits made due to the soil extracted may cause death during rainy seasons (kids play in it and may sink)	They should fill the holes when the project is completed
A6	Dust will be produced during dry season	Pour water frequently
A7	Houses in 100m radius will be affected due to the vibrations, noise etc	Compensating
A8	Old techniques of constructing roads used to use the cutting of trees which were used to heat up the tar which produced huge amount of smoke that affected the surrounding environment	
Operation phase		

B	Negative Impacts	Mitigation Measure
B1	Accidents due to speeding	-Put section for people to pass -Road signs -Humps
B2		

Socio-economic & gender profiles

12. If you were to rank the community members into three wealth categories (rich, poor and ultra-poor) (i) how are they distributed using 10 seeds? (ii) how would they compare in the areas of food, housing, source of income and assets?

INDICATORS	RICH_____2_____ of 10	POOR_____3_____ of 10	ULTRA-POOR_____5_____ of 10
Food situation	Eat 3or 4 times a day Eat well (milk, bread, good food, etc.) Have food for the whole year Drink tea at 4pm	Eat 2 times or once a day Eat cassava, potato etc. Have food seasonal	Eat once or none day Eat nsima with thelele no breakfast Have food through to casual labou
Housing	House completed, plaster, well roofed	Roofed with grass Not plastered but has a cement floor	Kitchen, bedroom are in a sing room No proper roof

Source income	Large businesses (not seasonal) Capable of cultivating huge chunks of land e. g 15 acres Issuing out katapila to the poor	Seasonal businesses Rely on the rich when doing business Cultivate small pieces of land	Casual labour Benefit a lot from the two groups but sell their produce at a low price
Assets	Cars, flock of goats, flock of sheep, motorcycle, cattle, TV , chairs, good beddings	One motorcycle	Bicycle

13. What are the differences or similarities between men and women of this community on these aspects?

a. Activity Profile

	WOMEN <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	MEN <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	Remarks
Household chores (cleaning, washing, mopping, food preparation)	xx	X	Men do household chores at times in case the wife is sick or away
Fetching water	xx	X	Men just help out in case wife is sick or away

Fetching firewood	x	Xx	Firewood is bought by the men charcoal is also bought by men
Cultivation & maintenance	xx	X	Both men and women work equally in the fields
Harvesting/post-harvest	xx	X	

b. Access and control Profile

Resources	Access (opportunity to use or own resource) <i>Dominate (XX); don't dominate (X)</i>		Control (Power to decide how it's used) <i>Dominate (XX); don't dominate (X)</i>		Remarks
	women	men	Women	men	
Land	x	xx	X	xx	When a woman is married make decision unless the man is dead but mostly a consensus between the woman and the husband
Forest resources (trees, fruits...)	x	xx	X	xx	
Poultry (chickens, ducks...)	xx	x	X	xx	

Resources	Access (opportunity to use or own resource) <i>Dominate (XX); don't dominate (X)</i>		Control (Power to decide how it's used) <i>Dominate (XX); don't dominate (X)</i>		Remarks
	women	men	Women	men	
Small ruminants (sheep, goats...)	xx	x	X	xx	
Cattle, pigs	xx	x	X	xx	
Credit (VSL, micro finance groups...)	xx	x	Xx	x	
Income from crop sales	x	xx	X	Xx	
Income from livestock sales	x	xx	X	Xx	
Income from casual labor	x	xx	X	xx	
Income from small businesses	xx	x	Xx	X	

Resources	Access (opportunity to use or own resource) <i>Dominate (XX); don't dominate (X)</i>		Control (Power to decide how it's used) <i>Dominate (XX); don't dominate (X)</i>		Remarks
	women	men	Women	men	
Income from formal employment	x	xx	X	xx	
Income from natural resources	x	xx	X	Xx	
Income from Fishing					The lake is at a distance but even though men dominate in all aspect

c. Sources of income

	<i>Many pple (XX) Some pple (XX) Few pple (X)</i>	Women <i>Dominate (XX) Don't dominate(X)</i>	Men <i>Dominate (XX) Don't dominate(X)</i>	Remarks
Formal employment (specify)				
Teaching	x	x	Xx	

	<i>Many pple (XX)</i> <i>Some pple (XX)</i> <i>Few pple (X)</i>	Women <i>Dominate (XX)</i> <i>Don't dominate(X)</i>	Men <i>Dominate (XX)</i> <i>Don't dominate(X)</i>	Remarks
Cattle headers	x	x	Xx	
Skill-based IGA's (specify)				
Tailoring	x	x	Xx	
Welding	x	x	Xx	
Other businesses (specify)				
Money from agricultural products sells	xxx	x	X	50-50
Other income sources (specify)				
Remittance	x	xx	X	

d. Literacy Levels

Highest education level	<i>Many pple (XXX)</i> <i>Some pple (XX)</i> <i>Few pple (X)</i>	Women <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	Men <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	Remarks
Numeracy skill only	xxx	x	X	50-50
Primary school	xxx	x	X	50-50
Secondary school	x	x	Xx	Early pregnancy / marriage
Tertiary (Vocational)	x	x	Xx	
Tertiary (academics/professional)	x	x	Xx	

14. What type of community structures are available in this area?

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	<i>very effective</i> <i>effective -2</i> <i>ineffective -3</i>	Remarks
			Females	males			
ADC	x	xx	x	x	x	3	

Community structures/committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	<i>very effective</i> <i>effective -2</i> <i>ineffective -3</i>	Remarks
			Females	males			
VDC	7	9	1		1	3	
VSLs	xx	x	x	x	x	3	Bank nkhonde Ineffectiveness because most people don't afford repay their loans which results in selling their personal items
Agriculture (specify)							
VAG	xx	x	x	x	Nil	3	VAG doesn't give report to the committee i. e. not transparent
Cluster club	xx	x	x	x	Nil	2	They're given the capacity on how they can cultivate together as a group as well as sell their produce as a group
Environmental (specify)							
Mkaika forest group	xx	x	x	x	Nil	2	They promote reforestation They safe guard the forest and other natural resources in the environment

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	<i>very effective</i> <i>effective -2</i> <i>ineffective -3</i>	Remarks
			Females	males			
Water (specify)							
Borehole committee	xx	x	x	x	Nil	3	Politicians ruined the entrustment in these people who should maintain water resources like boreholes thereby disturbing the rules of order
Health (specify)							
CHAG	xx	x	x	x	x	1	Very effective as it monitors the condition of toilets and other sanitary structures around and gives a report to the responsible authorities weekly
Education (specify)							
Girl/women empowerment (specify)							
Mother group	xx	x	Nil	Nil	Nil	2	Targets a girl child They ensure that those that were impregnated whilst in school go back to school after delivery
Civil rights and protection of vulnerable groups (specify)							

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	<i>very effective</i> <i>effective -2</i> <i>ineffective -3</i>	Remarks
			Females	males			
Business groups (specify)							

15. Which organisations are operating in this community?

CBO's, FBO NGO's	Target group	Activities	Use Community-based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Agriculture (specify)						
Environmental (specify)						
Water (specify)						

CBO's, FBO NGO's	Target group	Activities	Use Community- based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Health (specify)						
Afikepo	Children	Monitor the health and nutrition children	nil	available	nil	2
		Better motherhood	nil	available	nil	2
Education (specify)						
	Nil					
Girl/women empowerment (specify)						
Mother group	Young pregnant girls	Ensuring that the girl child goes back to school after giving birth.	nil	available	2	

CBO's, FBO NGO's	Target group	Activities	Use Community- based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Civil rights and protection of vulnerable groups (specify)						
Nil						
Microfinance						
Cumo	Both men and women	Lends money to women mostly than men Assist in enhancing bank nkonde		Nil	2	Lends money to women mostly than men
Finca	Both men and women	Lends money to women mostly than men		Nil	3	Lends money to women mostly than men
Dap	Both men and women	Assists with bank nkonde Assist in enhancing bank nkonde	available	Nil	2	

CBO's, FBO's, NGO's	Target group	Activities	Use Community-based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective 3</i>	Remarks
Other business-oriented organizations (specify)						

A2.3.3 Mkaika Focus Group Discussion with Women

TA: Mwadzama

GVH: BANGO

Name & Type of FGD: Mkaika Women's FGD

DATE: Saturday 22ND January, 2022.

About the project

1. What do you know about the project? (Observe and record general reaction.)

- Some have heard of the project two years ago.
- Some have never heard of this development.

2. How important is the road to the surrounding communities?

- Businesses that are situated along the road have greater chances of selling their products and goods to other road users who are travelling or are only passing through.
- Travelling to different places is made easy regardless the state of the road currently, for the road is passable all year.
- It's used for transportation of fertilizers and other agriculture inputs and other goods.
- We use the road to travel to the hospital at Nkhotakota boma.
- Easy transport of students to school.

3. How will the rehabilitation of the road affect the people and the natural environment?

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure
A1	Employment opportunities for community members	<ul style="list-style-type: none">• The assembly to design an appropriate employment plan or procedure so as to achieve equal employment.

		<ul style="list-style-type: none"> Involve community leaders in the process.
A2	Businesses would boom	<ul style="list-style-type: none"> Resources such as sand, rocks and wood must be sourced from within.
A3	Development in the area due to the money flow as the result of the employments and businesses.	
A4	Source of school fees and school uniforms	
A5	Improved and strengthened marriage due to earning from the project.	
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	<ul style="list-style-type: none"> It will ease transportation of products and services to other parts of the country. 	
B2	<ul style="list-style-type: none"> Minimised risks of road accidents 	
B3	<ul style="list-style-type: none"> People who do taxi businesses will increase their earnings since they will be making more trips with good road 	
B4	Prevention of loss of lives of pregnant women and unborn babies since they will	

	be ferried to the hospital on time and smoothly	
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NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure
A1	<ul style="list-style-type: none"> Increased spread of HIV/AIDS and COVID -19 Early marriages, early pregnancies, disturbs of marriages Disturbance of classes due to students missing classes to watch the construction machinery 	<ul style="list-style-type: none"> HIV/AIDS sensitization meeting held locally with the community chaired by the village heads and all individually as parents' advice children on the prevention of HIV/AIDS and also COVID-19 Self-responsibility of preventive measures. Mother group should follow up on school children to know their whereabouts, to make sure they are not involved with construction workers.
A2	<ul style="list-style-type: none"> Since shops and property along the road will be demolished there will be loss of property and business crumbling. • Damage to farm fields, (Maize fields, cassava and Rice fields). 	<ul style="list-style-type: none"> Give Compensations
A3	<ul style="list-style-type: none"> Damage to natural resources. 	On theft issues: Create use police forum
A4	<ul style="list-style-type: none"> Sexual exploitation at work 	Report to boss then the police

A5	<ul style="list-style-type: none"> • Theft construction material 	The contractor should work with community police forum
Operation phase		
B	Negative Impacts	Mitigation Measure
B1	<ul style="list-style-type: none"> • Loss of employment and businesses due to the end of the project. 	
B2	<ul style="list-style-type: none"> • Death due to AIDS which was taken during construction phase. • Abandoned children without support. 	Sensitisation during construction
B3	<ul style="list-style-type: none"> • Road accident due to speeding. 	Placement of road signs; speed limit show busy places like trading centres schools

Socio-economic & gender profiles

16. If you were to rank the community members into three wealth categories (rich, poor and ultra-poor) (i) how are they distributed using 10 seeds? (ii) how would they compare in the areas of food, housing, source of income and assets?

INDICATORS	RICH _____ 2 _____ of 10	POOR _____ 3 _____ of 10	ULTRA- POOR _____ 5 _____ of 10
Food situation	<ul style="list-style-type: none"> - Has food all year for the household - Surplus food. - Eat all food groups 	<ul style="list-style-type: none"> - They don't eat 3 times a day - Do not eat all food groups 	<ul style="list-style-type: none"> - Can go days without food - Bad quality food.
Housing	<ul style="list-style-type: none"> - Lives in a self-contained house - 	<ul style="list-style-type: none"> - A small house which is grass thatched 	<ul style="list-style-type: none"> - A house which is not properly thatched. - No doors or windows

			- One roomed hou
Source income	<ul style="list-style-type: none"> - Big Businesses - Commercial farming - Formal employment 	<ul style="list-style-type: none"> - Small businesses - Casual labour - Subsistence farming 	Beg for food assistance/ financial
Assets	<ul style="list-style-type: none"> - Sofas, beds, screens - Animals; cattle, pigs, goats - Cars - Houses 	<ul style="list-style-type: none"> - Nkhuku, Bakha - Metal plates - Bicycle 	<ul style="list-style-type: none"> - Have a worn-out mat - Worn out dishes - A chitenje for covering when sleeping.

17. What are the differences or similarities between men and women of this community on these aspects?

a. Activity Profile

	WOMEN <i>Dominant (XX)</i> <i>Don't dominate (X)</i>	MEN <i>Dominant (XX)</i> <i>Don't dominate (X)</i>	Remarks
Household chores (cleaning, washing, mopping, food preparation)	xx	X	
Fetching water	xx	X	
Fetching firewood	xx	X	

Cultivation maintenance	xx	X	
Harvesting/post- harvest	Xx	X	

b. Access and control Profile

Resources	Access (opportunity use or over resource)		Control (Power to decide how it used) <i>Dominant (XX); don't dominate don't dominate (X)</i>		Remarks
	women	men	Women	men	
Land	x	xx	X	xx	
Forest resource (trees, fruits...)	x	xx	X	Xx	
Poultry (chicken, ducks...)	X	xx	X	x	
Small luminants(sheep, goats...)	x	xx	X	Xx	
Cattle, pigs	x	xx	X	Xx	- Depends on the way the cat was procured
Credit (VSL, micro finance groups...)	xx	x	X	X	
Income from crop sales	x	x	X	Xx	

Resources	Access (opportunity use or over resource)		Control (Power to decide how it used) <i>Dominant (XX); Don't dominate (X)</i>		Remarks
	women	men	Women	men	
Income from livestock sales	x	x	X	X	
Income from casual labour	xx	x	X	Xx	- Even if the money is earned by the woman, men still dominate in deciding the use of the money
Income from small businesses	xx	x	Xx	X	- Many women engage businesses that sustain the family while the men just drink beer.
Income from formal employment	x	xx	X	Xx	
Income from natural resources	x	xx	X	Xx	
Income from Fishing	x	xx	X	Xx	

c. Sources of income

	Many ppl (XXX) Some ppl (XX) Few ppl (X)	Women Dominate (X) Don't dominate(X)	Men Dominate (XX) Don't dominate(X)	Remarks
Formal employment (specify)				
Teachers	xx	x	Xx	
Health workers	xxx	x	Xx	
Skill-based IGA's (specify)				
Carpenter	X		Xx	- No women because have not been trained
Builders	xx		Xx	
Welders	X	X	Xx	
mechanics	x			
tailors	Xxx	X	Xx	
Plumbers	X		Xx	
Other businesses (specify)				
Selling second hand clothes	x	X	X	
Selling fish	xxx	X	X	
shops	x	X	Xx	

	<i>Many pple (XXX)</i> <i>Some pple (XX)</i> <i>Few pple (X)</i>	Women <i>Dominate (X)</i> <i>Don't dominate(X)</i>	Men <i>Dominate (XX)</i> <i>Don't dominate(X)</i>	Remarks
Selling vegetables	x	xx	X	
Other income sources (specify)				
begging	x	xx	X	

d. Literacy Levels

Highest education level	<i>Many pple (XXX)</i> <i>Some pple (XX)</i> <i>Few pple (X)</i>	Women <i>Dominate (X)</i> <i>Don't dominate(X)</i>	men <i>Dominate (XX)</i> <i>Don't dominate(X)</i>	Remarks
Numeracy skill only	xx	Xx	x	
primary school	xxx	Xx	X	
Secondary school	xx	X	Xx	
Tertiary (Vocational)	X	Xx	x	

Tertiary (academics/professional)	x	X	x	Not sure about t figures
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18. What type of community structures are available in this area?

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	<i>very effective -1 effective -2 ineffective</i>	Remarks
			Females	males			
ADC	x	xx		x	x	2	
VDC	x	xx			x	1	
VSLs	xx	x				2	
Agriculture (specify)							
VAC	x	xX				1	
CLUSTER	x	x				1	
CARE GROUP	XX	X				1	
Environmental (specify)							
VFC	X	XX	X	X		1	

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective	Remarks
			Females	males			
MKAIKA YOUTH CLUB		X	X	X	X	1	
Water (specify)							
Unaware of any							
Health (specify)							
CHAG	Xx	x	X	X	x	1	
CARE GROUP	XX	X	X	X		1	
VHC	X	XX	X	X	X	1	
Education (specify)							
MOTHER GROUP	XX					1	
SCHOOL COMMITTEE	X	X				1	
Girl/women empowerment (specify)							

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective	Remarks
			Females	males			
MOTHER GROUP	XX					1	
Civil rights and protection of vulnerable groups (specify)							
VRC	X	XX				1	
Business groups (specify)							

Which organisations are operating in this community?

CBO's, FBO's, NGO's	Target groups	activities	Use Community based facilitators	Use community Volunteers	PWDs Very effective 1 Effective 2 Ineffective	Remarks
Agriculture (specify)						
NASFAM	Rice farmer	- Provide seedlings - Buy seeds/products			Yes	1
Environmental (specify)						

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Water (specify)						
Water Ai	community	-provide portab water		yes	3	Phased o and the pipes a no long providing water.
Health (specify)						
Education (specify)						
		-				
Girl/women empowerment (specify)						
Civil rights and protection of vulnerable groups (specify)						
Microfinance						
CUMO	Small a medium businesses	- Provide loans - Trainings		yes	1	

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Other business-oriented organizations (specify)						

A2.3.4 Benga Focus Group Discussion with Women

TA: Mwadzama

GVH: Chakaka

Name & Type of FGD: Men's FGD Benga TDC

Date: Thursday 20th January, 2022.

About the project

1.What do you know about the project? (Observe and record general reaction.)

- Some have heard of it years ago.
- Some heard about the news two years ago and some as late as 2015.
- Some heard through the surveys.

2.How important is the road to the surrounding communities?

- Easy access to different destinations including hospitals.
- Ease in the transportation of goods and services not only within Nkhotakota but also to all parts of the country.
- Transportation of farm produce to main markets.

3.How will the rehabilitation of the road affect the people and the natural environment?

POSITIVE IMPACTS

Construction phase		
A	Positive Impacts	Enhancement Measure

A1	The community will find employment.	<ul style="list-style-type: none"> When sourcing for employees the contractor in collaboration with the assembly through the labour office must make sure that people are employed following the right procedures.
A2	<p>Economic status of the community will significantly improve especially for small businesses such as:</p> <ul style="list-style-type: none"> Rest houses and lodges Shops (Including grocery shops, barbershops, tailors) 	
A3	Benefits from compensations to damaged property: houses, farm fields and shops along the road.	<ul style="list-style-type: none"> Pay compensation before works begin. People need to know from the start who will pay the compensations. Appropriate committee that takes care of issues on how compensation is followed to avoid conflicts.
Operation phase		
B	Positive Impacts	Enhancement Measure
B1	<ul style="list-style-type: none"> Prevention of accidents due to the road made wider, as compared to currently, when there are more accidents due to the narrowness of the road, vehicles easily crush into 	<ul style="list-style-type: none"> There has to be a construction of appropriate road signs to prevent accidents and there has to be hum and rumble surfaces to prevent drivers from over speeding.

	each other while underestimating the width of the road which also affects pedestrians and along the road.	
B2	<ul style="list-style-type: none"> • Mobility made easy and with comfort and also travelling to different destinations will be faster therefore goods and services will be delivered in good time. 	
B3	<ul style="list-style-type: none"> • Less damage to products and other perishable goods such as fish. 	
B4	<ul style="list-style-type: none"> • Less flooding and little damage to property and loss of life as a result of the construction of culverts and proper road. • Economic status of the area and Nkhotakota as a district shall improve. 	

NEGATIVE IMPACTS

Construction phase		
A	Negative Impacts	Mitigation Measure
A1	<ul style="list-style-type: none"> • Closure of shops as well as businesses will crumble due to the demolition of buildings and other structures along the road. • Community people especially farmers will lose land and property 	There has to be an appropriate procedure in sorting those that need refunds and compensations.

	<p>in the sense that there is limit compensation, for instance, when shop has been demolished, it has been noticed that the value of the shop and property are undervalued</p>	
A2	<ul style="list-style-type: none"> Many marriages will dissolve due to women being compelled to work as constructing workers seeking short term relationship for money. School going children will be affected, some will surely drop out from school due falling pregnant especially for the girl child. And boys shall be disturbed in their studies due to absconding from school for watching machines at work. 	<ul style="list-style-type: none"> There has to be an establishment of committee that advise women and sensitize the community about dangers of hooking up with visitors in the land in order to save their marriages. Families must advise their girls and children as well as boys not to interact with any activities related to the project or being coerced to give money from strangers in order to protect them.
A3	<ul style="list-style-type: none"> Spread of HIV/AIDS and COVID-19 since there will be a interaction with a completely new population. 	Assembly in collaboration with the village committee must engage in the sensitization campaigns in order to alert and equip people for their own safety
A4	<ul style="list-style-type: none"> Accidents at the construction site. When work is in progress affecting both children and labourers. 	In order to reduce the risk of preventable accidents, workers must always be encouraged to wear protective gears.
A5	<ul style="list-style-type: none"> Resources shall become limited as hospitals due to population increase. Pollution during construction, dust, fumes and oils. 	There must be use of water bowser and appropriate dumping sites for wastes to avoid spread of diseases.
Operation phase		

B	Negative Impacts	Mitigation Measure
B1	<ul style="list-style-type: none"> Accidents due to over speeding and reckless driving due to the smooth and wider road from reckless drivers. 	<ul style="list-style-type: none"> There should be a collaboration between committees in the area, together with relevant departments in order to formulate appropriate guidelines in protecting people from accidents. The road should be constructed with speed limiting structures such as humps, rumble surfaces and appropriate road signs.
B2	<ul style="list-style-type: none"> Increased crime in the area since the area is now made accessible by practically everyone therefore attracting criminals. 	

Socio-economic & gender profiles

19. If you were to rank the community members into three wealth categories (rich, poor and ultra-poor) (i) how are they distributed using 10 seeds? (ii) how would they compare in the areas of food, housing, source of income and assets?

INDICATORS	RICH _____ 1 _____ of 10	POOR _____ 2 _____ of 10	ULTRA-POOR _____ 3 _____ of 10
Food situation	<ul style="list-style-type: none"> Has food all year for the household and can give to others too. Has choice of food and diversity of diet 	<ul style="list-style-type: none"> Able to find food but have limited choice of food Do not eat all food groups 	<ul style="list-style-type: none"> Can go days without food

	<ul style="list-style-type: none"> - Eat all food groups - Has food storage facilities 		
Housing	<ul style="list-style-type: none"> - Lives in a self-contained house - Iron sheet roofed - 	<ul style="list-style-type: none"> - Lives in at least a decent house. 	<ul style="list-style-type: none"> - May be a doorless house and in bad shape - House built using mud. - Grass thatched but also leaking
Source of income	<ul style="list-style-type: none"> - Business and employment 	<ul style="list-style-type: none"> - Subsistence farming 	Causal labour
Assets	<ul style="list-style-type: none"> - Has car/s - House/s 	<ul style="list-style-type: none"> - Has a bicycle - Has a motor bike - Has a house 	<ul style="list-style-type: none"> - Few or one set of clothes -

20. What are the differences or similarities between men and women of this community on these aspects?

a. Activity Profile

	WOMEN <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	MEN <i>Dominate (XX)</i> <i>Don't dominate (X)</i>	Remarks
Household chores (cleaning, washing, mopping, food preparation)	x	Xx	

Fetching water	x	Xx	
Fetching firewood	x	X	
Cultivation maintenance	x	X	
Harvesting/post- harvest	X	Xx	But it sometimes depends on households, the difference is very small

b. Access and control Profile

Resources	Access (opportunity to use or own resource) <i>Dominant (XX); don't dominate (X)</i>		Control (Power to decide how used) <i>Dominant (XX); don't dominate (X)</i>		Remarks
	women	men	women	men	
Land	x	xx	x	xx	- When land has been bought by a couple it belongs to the two jointly
Forest resource (trees, fruits...)	xx	x	x	Xx	
Poultry (chickens, ducks...)	Xx	x	xx	x	
Small ruminants (sheep, goats...)	x	xx	x	X	- Sometimes when the husband wants to sell the goat, the wife has power to deny.

Resources	Access (opportunities to use or own resource) <i>Dominant (XX); don't dominate (X)</i>		Control (Power to decide how used) <i>Dominant (XX); don't dominate (X)</i>		Remarks
	women	men	women	men	
Cattle, pigs	x	xx	x	X	- But its mostly not very easy for the males to sell without the consent of their spouses.
Credit (VSL, micro finance groups...)	xx	x	xx	X	
Income from crop sales	x	x	x	Xx	- As a region men are dominant in decision making however a small percentage decide together.
Income from livestock sales	x	xx	x	Xx	- But it depends on household
Income from casual labour	x	xx	x	Xx	
Income from small businesses	x	xx	x	Xx	
Income from formal employment	x	xx	x	Xx	
Income from natural resources	x	xx	x	Xx	
Income from Fishing	x	xx	x	Xx	

c. Sources of income

	Many p (XXX) Some p (XX) Few pple (X)	Women Dominate (X) Don't dominate(X)	Men Dominate (X) Don't dominate(X)	Remarks
Formal employment (specify)				
Teachers	x	x	Xx	Not many from the area have been employed in formal employment
Health workers	x	x	Xx	
Skill-based IGA's (specify)				
Carpenter	Xxx	X	Xx	
Builders	Xx	X	Xx	
Welders	X	X	Xx	
drivers	X	x	Xx	
Other businesses (specify)				
Small food businesses	xxx	Xxx	X	
Agro-dealers and shops	xx	X	Xx	
Barbershops	x	X	Xx	
Butcheries	x	x	Xx	
Other income sources (specify)				
begging	x	xx	X	

d. Literacy Levels

Highest education level	Many p (XXX) Some p (XX) Few p (X)	Women Dominate (X) Don't dominate(X)	men Dominate (X) Don't dominate(X)	Remarks
Numeracy skill only	xxx	x	x	
primary school	xx	xx	X	- Due to pregnancies mo women fall to go beyo primary
Secondary school	xx	x	Xx	- Women get pregnant a some rush to get marri hence dropping out school
Tertiary (Vocational)	X			
Tertiary (academics/professional)	x			

21. What type of community structures are available in this area?

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effect -1 effective -2 ineffective	Remarks
			Females	males			
ADC	x	xx				2	Do not know m information on t because its above th knowledge and level.

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective -3	Remarks
			Females	males			
VDC	x	xx	x	x	x	2	
VSLs	xx	x	xx	x	x	1	- Men spend time elsewhere and grow crops that favours women
Agriculture (specify)							
Livestock committees	xx	x				1	- Due to the efforts of the AFIKEPO projects which facilitates these activities
Agronomy committees	xx	x				1	
Environmental (specify)							
Unaware of any							
Water (specify)							
Unaware of any							

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective -3	Remarks
			Females	males			
Health (specify)							
HAC	x	x			x	1	
Education (specify)							
PTA	X	X			X	1	
Girl/women empowerment (specify)							
	XX	X			X	1	Have no idea about what its called
Civil rights and protection of vulnerable groups (specify)							
Unaware of any							
Business groups (specify)							
Mphakwe cooperative	x	xx	x	xx	x	1	

Community structures/ committees/groups	No. Women	No. Men	No. of Youth		No. PWDs	very effective -1 effective -2 ineffective -3	Remarks
			Females	males			
COMSIP	X	XX	X	XX	X	1	

22. Which organisations are operating in this community?

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs Very effective 1 Effective 2 Ineffective 3	Remarks
Agriculture (specify)						
Environmental (specify)						
Water (specify)						
Muslim Association of Malak (MAM)	Everyone in the community	- Install borehole				- The borehole are not connected to standard water not available

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
						all ye round - Borehole are n deep enough provide water year. T borehole are su using manual digging.
Health (specify)						
Chindamba CBO	Youth	<ul style="list-style-type: none"> - Support some youth with Education support - Provide support people living with HIV/AIDS 		yes	1	
Education (specify)						

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
Benga pari	Communit children	- Building school blocks - Busary			1	They do activities themselves.
Girl/women empowerment (specify)						
Civil rights and protection of vulnerable groups (specify)						
Microfinance						
DAPP	Bank Nkhonde	- provid financial trainin - linking t village banks other microfinance organisations		yes	1	
Farmer SE	Bank nkhonde	- provid financial trainin - linking t village banks other		yes	1	

CBO's, FBO's, NGO's	Target group	activities	Use Community based facilitators	Use community Volunteers	PWDs <i>Very effective 1</i> <i>Effective 2</i> <i>Ineffective</i>	Remarks
		microfinance organisations				
Other business-oriented organizations (specify)						

A2.3.5 Community leaders FGD, TA Kanyenda VDC REPS

Venue: Walemera school

Facilitator: David Mtekateka

Note-taker: Lilian Lucas

Date: 30th November, 2023.

1. How many GVHs are under each VDC?

	VDC	GVHs
1	Aaron	Chisanjire, Kapondo, Mwasambo
2	Nkhombozi	Nkhombozi
3	Longwe	Longwe
4	Matelezi	Matelezi
5	Tito	Tito
6	Chimtumbuka	Chimtumbuka
7	Malume	Malume
8	Mphikhamphika	Mphikhamphika
9	Kambola	Kambola

10	Sinde	Sinde
11	Chia	Chia
12		

2 What are the socio-cultural dynamic in the project affect communities in terms ethnicity and intermarriages, religious affiliations?

- Ethnicity: The Chewa tribe is dominant comparing the Yao, Tonga and Lomwe
- Religious: Christians (Anglican, Pentecostal, and catholic) are the most common religion comparing to the Muslims
- Intermarriages: Different races marrying each other's

3 The previous PAP survey showed that in the project area, there were more unmarried women who were either divorced or widowed; what factors could be attributed to this trend?

- We have a lot of women in our area comparing to men
- Most men are dying comparing to women
- Most men leave their wives behind as they go to South Africa
- Once a man is not well to do women leave these men as they believe they can survive on their own

4 Communal or public service facilities that will be displaced by project works?

Communal/institutional asset/ nature of displacement	Location	Affected GVHs	Resettlement preferences
Trees	Msenjere health center	Aaron	Compensation by cash
Borehole	Aaron	Aaron	The boreholes should be drilled before the projects starts The project should also add more boreholes in the community
Borehole	Khokholo	Longwe	
Borehole	Fumu chibwana,	Kholokholo ,Zangazanga	
Borehole	Kamwala primarily	Mphikapika	
Graveyard	Liwatadziwa	zangazanga	Discussing with the chiefs on where to move the graveyard Asking the owners of the graveyards on what to do
Fence	Liwaladzi CDSS	Zangazanga , phaso, Mowe5, Chimtumbuka	Rebuild the fence before the projects starts as it will be easy

			to still protect students from outside exposure during the construction work
Ground	Liwaladzi primarily school	Alongwa, Malaume, Amazondwe, Alongwa	Chiefs to find new places for another ground The chiefs and the community to seat down and discuss on where to put the new ground
Churches (Jehovah, New last and old last)	St .Joseph	Everyone	Rebuild the fence before the projects starts as it will be easy to still protect students from outside exposure during the construction work
Sugar cane farms	Tibate growers limited	Zangazanga	Compensating them with money
Market	Vitekete and Phaso Chingwangwa kamwa	Phaso, Vitekete, Chimtumbuka Kambola, Sinda	Build another market for them
Under five clinic	Kamwala	Maluma, Kambola, Sinda	Rebuild the fence before the projects starts as it will be easy to still protect students from outside exposure during the construction work
Toilets	Kabiza primarily school	Phaso, vitekete	Rebuild the toilets on a different place within the same premises

What is the status of social services in the project area?

Social service area	Current status	Road project dynamics
Access to portable water	➤ In trading centers boreholes are very far, for instance people at Walemera trading have to go to nearby schools to draw water	➤ The project to drill new borehole before they start with the project as most of the people depend on these boreholes

	<ul style="list-style-type: none"> ➤ One has to walk a distance of 5 KM to get to water sources ➤ Everyone in Kamwala drinks water from Kamwala which is not in enough for everyone as it brings pressure and conflicts in the community 	<ul style="list-style-type: none"> ➤ This project will bring more problems on water for instance more pressure on water sources
Health and sanitation	<ul style="list-style-type: none"> ➤ No toilets and bins in some households, markets and trading centers ➤ We do not have enough Health Surveillance Assistance ➤ Shortage of medicine in hospitals ➤ Hospitals are far from where most people leave 	<ul style="list-style-type: none"> ➤ Provisions of toilets, bins and every household in the community should be forced to have a toilet ➤ The project has to provide an Ambulance for the community ➤ The under-five clinics should be rebuild before the project starts
Primary and secondary education	<ul style="list-style-type: none"> ➤ There are no enough teachers and materials, as they are few blocks but too many children ➤ Children going long distances to get to schools, there only few schools in the area. For instance, they is only one secondary school in the area 	<ul style="list-style-type: none"> ➤ Children will be destructed during the road construction ➤ Putting humps and involving someone to teach these children on how to cross the road

Early child development centers	<ul style="list-style-type: none"> ➤ No materials to help these children learn ➤ Schools are far so most children do not attend school ➤ Children being chased out of churches were they you used to learn ➤ Schools are being segregated 	<ul style="list-style-type: none"> ➤ Children will be forced to stop going to school ➤ Build these children blocks were they can be learning in them
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What are your concerns regarding the process of identifying and compensating project affected persons in the area?

Issue Raised	Proposed redress
Once one is dead who will get their money and maybe their property was recorded, who will get the money?	Once your property has been skipped rush to the district council to be helped
Are those people leaving around that area going to be hired or are they the ones who will be working on this project?	All land within 30M belongs to the government hence it's up to them to decide if to give compensation or not
The VDC were not informed about the compensation	
What routines are they taking to compensate and those who were already compensated are they going to be compensated again?	The VDC should follow on any updates about incoming project
No researchers should in communities without going through the VDC	These are two different projects if the first one failed it means it has stopped as for this one is a new project and expect to see it soon
The government should stop speeding up processes and take one step at a time, as they are going through their processes	Sensitization, people should know where exactly to build their houses, plant trees and many more.
Most people who received compensation last time had no properties along the road and the	The VDC should go to the district council before the project begins to be aware of most the processes to be taking place during the project

	money given wasn't worth the property	
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The meeting was very effective as it was very helpful to the VDC and as it will be productive to the community.

A2.3.6 Community leaders FGD, TA Mphonde VDC REPS

Venue: TA Mphonde's Office

Facilitator: David Mtekateka

Note-taker: Lilian Lucas

Date: 01st December, 2023.

2. How many GVHs are under each VDC?

	VDC	GVHs
1	Ligumba	Ligumba
2	Kafita	Fodya, Chiputula, Kafita
3	Makoka	Makoka
4	Chingwalangwa	Chingwalangwa
5	Seleman	Sawasawa
6	Khuta	Khuta
7	Mkhombozi	Mkhombozi, Mussa
8	Jambwe	Jambwe
9	Kampanje	Kampanje
10	Ntonya	Ntonya, Chilowa, Alunda
11	Chiboko	Mwwpa, Khofi, Njovu, Chiboko 2
12	Mukumbula	Mukumbula
13	Chikombe	Ambombo, Chikombe
14	Mponde	Mponde, Mundota, Vimavi
15	Chitambe	Chitambe
16	Chikanda	Kamusuli, Chikanda, Masinja

- 5 What are the socio-cultural dynamic in the project affect communities in terms ethnicity and intermarriages, religious affiliations?
 - Ethnicity: The Chewa tribe is dominant comparing the Yao, Tonga and Lomwe
 - Religious: Christians (Anglican, Pentecostal, and catholic) are the most common religion comparing to the Muslims
 - Intermarriages: Different races marrying each other's
- 6 The previous PAP survey showed that in the project area, there were more unmarried women who were either divorced or widowed; what factors could be attributed to this trend?

- Most men end up killing themselves due to depression as most of them do not know how to share their feelings as compared to women
- Men turn to marry two wives or more hence many women opt to divorce as they do not get the attention they need
- High birthrate in girls comparing to boys
- Most men leave their wives behind as they go to South Africa
- Once a man is not well to do women leave these men as they believe they can survive on their own

7 Communal or public service facilities that will be displaced by project works?

Communal/institutional asset/ nature of displacement	Location	Affected GVHs	Resettlement preferences
Trees	<ul style="list-style-type: none"> • Mponde • Mtonya 	<ul style="list-style-type: none"> • Ndotu, Khutu, Chiboko, Chitambo, Chisumba, Miuzimu, Mponde, Makoka • Njovu, Chiboko2, Khofi, Muyepo 	<ul style="list-style-type: none"> • Compensation by cash and give them new trees to replant
Borehole	<ul style="list-style-type: none"> • Lozi 	<ul style="list-style-type: none"> • Mussa,Selemani, Chipala, Chingwangwa, Ligomba 	<ul style="list-style-type: none"> • Before shifting the old boreholes they should drill new boreholes for them
Borehole	<ul style="list-style-type: none"> • Mpangano 	<ul style="list-style-type: none"> • Mpangano 	
Graveyard	<ul style="list-style-type: none"> • Mutumbula 2 	<ul style="list-style-type: none"> • Mutumbula, Ntchambwe, Petro duwa 	<ul style="list-style-type: none"> • Moving them to a new place • The decision should come from the chiefs and the owners of the families
Graveyard	<ul style="list-style-type: none"> • Mussa 1 	<ul style="list-style-type: none"> • Mussa 1 	
Graveyard	<ul style="list-style-type: none"> • Konchi 	<ul style="list-style-type: none"> • Mussa 1,Selemani, Mussa 2, Nkotchi, Tambala, Achipala 	

Mponda Gaga	<ul style="list-style-type: none"> Chikombe 	<ul style="list-style-type: none"> Ndota, Khutu, Chiboko, Chitambo, Chisumba, Miuzimu, Mponde, Makoka 	<ul style="list-style-type: none"> Rebuilding in the same premises just different from where it was
Last church	<ul style="list-style-type: none"> Chikombe 	<ul style="list-style-type: none"> Chikombe, Mubobo, Nkhosi, Malo 	<ul style="list-style-type: none"> Moving the church to a different location but within the same premises
Seventh day	<ul style="list-style-type: none"> Chikombe 	<ul style="list-style-type: none"> Chikombe, Mubobo, Nkhosi, Malo 	
Market	<ul style="list-style-type: none"> Muyepa market 	<ul style="list-style-type: none"> Chikombe, Mubobo, Nkhosi, Malo 	
Market	<ul style="list-style-type: none"> Mtchabwe 	<ul style="list-style-type: none"> Petro, Mutchabwe2, Mutumbula 	<ul style="list-style-type: none"> Find a new place that is business oriented for the market They should leave the place with the market and divert the road to the other side where there shops
Market	<ul style="list-style-type: none"> Mpangano 	<ul style="list-style-type: none"> Kafita, Kampanje, Kantonya, Mussa1 	
Market	<ul style="list-style-type: none"> Lozi 	<ul style="list-style-type: none"> Selemani, Mussa2 	
Post office	<ul style="list-style-type: none"> Lozi 	<ul style="list-style-type: none"> The whole Mphonde area or community 	<ul style="list-style-type: none">

What is the status of social services in the project area?

Social service area	Current status	Road project dynamics
Access to portable water	<ul style="list-style-type: none"> ➤ Boreholes in most areas do function ➤ Marion brings water by improvising of 	<ul style="list-style-type: none"> ➤ Problems will rise in terms of water due to less water and

	<p>shallow well which usually dry up during high intensity</p> <ul style="list-style-type: none"> ➤ Water from KIOSK in Mpondagaga, Lozi, Nduluka, Mwala, Waongole 	<p>few boreholes as it already is</p> <ul style="list-style-type: none"> ➤ The project should provide more boreholes and bring them before the project starts
Health and sanitation	<ul style="list-style-type: none"> ➤ We do not have enough Health Surveillance Assistance as they do not leave around the area they have been allocated to due to electricity and water in most areas ➤ Shortage of medicine in hospitals ➤ Hospitals are far from where most people leave 	<ul style="list-style-type: none"> ➤ Provisions of toilets, bins and every household in the community should be forced to have a toilet ➤ Provide a temporarily road to be used to get to the hospital and at least it will also reduce accidents
Primary and secondary education	<ul style="list-style-type: none"> ➤ At the beginning of STD1 their more children but as they finish primarily we only have few children as they go fishing, mining and getting married. Most children do not see the importance of school ➤ Pool tables, video shows along the road and taverns near school premises, these usually distract children ➤ Children going long distances to get to schools, there only few schools in the 	<ul style="list-style-type: none"> ➤ Children will be destructed during the road construction ➤ The VDC has to start going in schools to teach the children about the incoming project ➤ The project is going to affect both boys and girls, as girls might start sleeping with these men and boys getting involved in wanting to learn how to drive or working there. This will distract most children

	area. For instance, they is only one secondary school in the area	
Early child development centers	<ul style="list-style-type: none"> ➤ No materials to help these children learn ➤ Schools are far so most children do not attend school ➤ Children being chased out of churches were they you used to learn ➤ Schools are being segregated 	<ul style="list-style-type: none"> ➤ VDC to be going to check on these children for safety sake ➤ These teachers work for free at least a little something should be given to them ➤ Children will be forced to stop going to school ➤ Build these children blocks were they can be learning in them

What are your concerns regarding the process of identifying and compensating project affected persons in the area?

	Issue Raised	Proposed redress
	The community will not allow the project to commence as they were not paid for the properties that were destroyed	Once your property has been skipped rush to the district council to be helped
	In 2019 the mortal Angel removed cassava and trees that belonged to people and never compensated them	African development bank is the one fixing the road now
	Are those people leaving around that area going to be hired or are they the ones who will be working on this project?	These are two different projects if the first one failed it means it has stopped as for this one is a new project and expect to see it soon
	The VDC were not informed about the compensation	The VDC should follow on any updates about incoming project
	No researchers should in communities without going through the VDC	The VDC should go to the district council before the project begins to be

		aware of most the processes to be taking place during the project
	The government should stop speeding up processes and take one step at a time, as they are going through their processes	Sensitization, people should know where exactly to build their houses, plant trees and many more.

A2.3.7 Community leaders FGD, TA Malenga Chanzi VDC REPS

Venue: Linga EPA offices

Facilitator: David Mtekateka

Note-taker: Lilian Lucas

Date: 1st December, 2023.

3. How many GVHs are under each VDC?

	VDC	GVHs
1	Makuta	Malasa, Makuta 1, Makuta 2, Chibala
2	Kamange	Kamange 1, Kombo
3	Mbaluku	Mbaluku 1, Chiputa
4	Kelama	Kawelama
5	Ngoma	Ngoma, Makuta, Selemeni, Phangwa, Katimbira
6	Malengajazi	Matekenya, Malenga
7	Nkhandwe	Thundaza, Nkhandwe
8	Chota	Chota, Mazengela
9	Chamba	Chamba
10	Chithumbwi	Mbale, Chithumbwi
11	Chiwutula	Chiwutula, Chikwenda

4. What are the socio-cultural dynamic in the project affect communities in terms ethnicity and intermarriages, religious affiliations?
 - Ethnicity: The Chewa are the most common group of people in this area, followed by THE Tumbuka then Yao plus a number of other clans like lomwe and Alikoma
 - Religious: Muslims and Christians (Catholic, CCAP and Assembly)
 - Intermarriages: Different races marrying each other's
5. The previous PAP survey showed that in the project area, there were more unmarried women who were either divorced or widowed; what factors could be attributed to this trend?
 - High death rate in men comparing to women
 - We have a lot of women in our area comparing to men
 - Men turn to marry two or three wives and they divorce them hence more women are left without husbands

6. Communal or public service facilities that will be displaced by project works?

Communal/institutional asset/ nature of displacement	Location	Affected GVHs	Resettlement preferences
Tress	<ul style="list-style-type: none"> • Chota village • Mchemera • Chisoti • ADMARC • Anglican 	<ul style="list-style-type: none"> • Chota • Mchemera 	<ul style="list-style-type: none"> • compensation
Borehole	<ul style="list-style-type: none"> • Chitonto 	<ul style="list-style-type: none"> • Chota and Mazengela 	<ul style="list-style-type: none"> • Drill another borehole for them within the same premises but away from the road
Toilets	Chota	<ul style="list-style-type: none"> • Chota 	<ul style="list-style-type: none"> • Compensation • Rebuilding them
Market	<ul style="list-style-type: none"> • Four ways 	<ul style="list-style-type: none"> • Malenga and Matekenya 	<ul style="list-style-type: none"> • To find new places and open a new market • Before the project comes the places should readily available
Mosque	<ul style="list-style-type: none"> • Chamuti 	<ul style="list-style-type: none"> • Malenga and Kawalema 	<ul style="list-style-type: none"> • Find the value out the value and give them the money

			<ul style="list-style-type: none"> • Build them a new mosque
Borehole(four)	<ul style="list-style-type: none"> • Kandera Kawerama 	<ul style="list-style-type: none"> • Malenga • Chiwutula 	<ul style="list-style-type: none"> • Reconstructing them before the project starts • By compensating them with cash
Borehole	<ul style="list-style-type: none"> • Chisoti school 	<ul style="list-style-type: none"> • Chiwutula 	
Borehole	<ul style="list-style-type: none"> • Safa 	<ul style="list-style-type: none"> • Malaenga and Chiwutula 	
Borehole	<ul style="list-style-type: none"> • Faya 	<ul style="list-style-type: none"> • Chikwendi and Chiwutula 	
Market	<ul style="list-style-type: none"> • Chamuti 	<ul style="list-style-type: none"> • Malenga • • Chitumbwi and Chiwutula 	<ul style="list-style-type: none"> • To find new places and open a new market • Rebuilding the markets before the project starts so as the places should readily available
Market	<ul style="list-style-type: none"> • Kandere kawerama 1 	<ul style="list-style-type: none"> • Mbaluka, Matekenya Kamange, Mpenje 	
Market	<ul style="list-style-type: none"> • Local market • 	<ul style="list-style-type: none"> • Chitumbwi, Chiwutula Kamange, Mpenje 	
Market	<ul style="list-style-type: none"> • Chisoti market • 	<ul style="list-style-type: none"> • Chitumbwi and Chiwutula • 	
Office and block	<ul style="list-style-type: none"> • Chisoti primarily 	<ul style="list-style-type: none"> • Chiwutula, Chitumbwi, Chota, Mazengela, Chinkhwen di 	<ul style="list-style-type: none"> • Compensation with cash • Rebuild what has been destroyed and it should be put around

			the same premises
Graveyards	<ul style="list-style-type: none"> • Mulani • Malasa • Farmer • Chazoloke ra 	<ul style="list-style-type: none"> • Chiwutula, Chikwendi 	<ul style="list-style-type: none"> • Chiefs to find another place with the help of the community far from the road • Compensation in cash
Graveyard	<ul style="list-style-type: none"> • Malasa 	<ul style="list-style-type: none"> • Kamange, Mpenje 	
Graveyard	<ul style="list-style-type: none"> • Chazoloke ra 	<ul style="list-style-type: none"> • Ngoma, Makuta, Selemani, Vinthenga 	
Graveyard	<ul style="list-style-type: none"> • Farmer 	<ul style="list-style-type: none"> • Makuta, Selemani, Makuta2, Malasa 	
Fence	<ul style="list-style-type: none"> • Agriculture 	<ul style="list-style-type: none"> • Makuta 	<ul style="list-style-type: none"> • Compensation in cash
TBA(midwife house)	<ul style="list-style-type: none"> • Chamba2 	<ul style="list-style-type: none"> • Chiwutula, Chitumbwi 	<ul style="list-style-type: none"> • They should rebuild it before beginning the project
Market	<ul style="list-style-type: none"> • Sun turn off • Trading 	<ul style="list-style-type: none"> • Chitumbwi , Chamba • Kamunde 	<ul style="list-style-type: none"> • Rebuilding the markets before the project starts so as the places should readily available

What is the status of social services in the project area?

Social service area	Current status	Road project dynamics
Access to portable water	<ul style="list-style-type: none"> ➤ Boreholes are the main sources of water ➤ There are few boreholes in the area 	<ul style="list-style-type: none"> ➤ The project to drill new borehole before they start with the project as most of the people

	<p>hence they is lots of pressure on the water sources due to highly populated areas</p> <ul style="list-style-type: none"> ➤ One borehole is used by a lot of people which usually brings conflicts among community members ➤ Nkhotankhota being a town planning area people are drilling boreholes in distanced places as they cannot put boreholes any how 	<p>depend on these boreholes</p> <ul style="list-style-type: none"> ➤ The project should be providing water to the community through water boozers ➤ This project will bring more problems on water for instance more pressure on water sources
Health and sanitation	<ul style="list-style-type: none"> ➤ Sanitation is poor in a way that there are no enough bins and toiles in market places ➤ The main bin in the deport has never been disposed leading to disposing of waste all over the place ➤ Shortage of medicine in hospitals ➤ Hospitals are far from where most people leave 	<ul style="list-style-type: none"> ➤ Provisions of cars and bins to be disposing and collecting waste ➤ People will be at risk of different diseases due to the dust caused by the machines ➤ Pouring of water in the communities once in a while to reduce these dusty places ➤ Mobilizing chiefs and the community on when the project is going to start ➤ The health surveillance assistance to be teaching people on sanitation while going around their households

Primary and secondary education	<ul style="list-style-type: none"> ➤ There are no enough teachers and materials ➤ Congestions in schools ➤ Children going long distances to get to schools 	<ul style="list-style-type: none"> ➤ Children will be destructed during the road construction ➤ Parents will be forced to escort their children to schools instead of focusing on others duties ➤ Put people in various places where the project is taking place as long as it's close to schools so as to direct children ➤ Putting humps and involving someone to teach these children on how to cross the road
Early child development centers	<ul style="list-style-type: none"> ➤ Parents do not see the importance of these centers ➤ Some centers are skipped as they are segregated and not given porridge 	<ul style="list-style-type: none"> ➤ Children will be forced to stop going to school ➤ The project should organize a program that will teach parents on how to help children

What are your concerns regarding the process of identifying and compensating project affected persons in the area?

Issue Raised	Proposed redress
Road authority should organize the right procedure on how to deliver messages to the community despite how desperate the people need the road, cause bad communication is causing chaos in communities	The VDC should consult the council before the projects starts

What routines are they taking to compensate people? This is not the first time people being compensated without using the right channel	All land within 30M belongs to the government hence it's up to them to decide if to give compensation or not
The project will bring money and if the community is not sensitized about the positive and negative impacts of it, as the project ends it will leave problems in communities such as pregnancy, diseases and many more	The VDC should talk to the person and advise them to go the council
When registering assets they should be cross checking on who the property belongs to with the chiefs and the VDC should be involved to minimize works	Awareness through the community leaders, teach them and brief them on the project
People do not know their land limits along the road as most of them just inherited from parents	Sensitization people on where exactly to build their houses, plant trees and many more
Register the ADC to be involved in helping in most of the processes to reduce problems in community	
Most people who received compensation last time had no properties along the road and the money given wasn't worth the property	Evaluators are trained to know the prices of these assets and properties by the government hence the prices determined

The meeting was very effective as the VDC were impressed with them being involved and the procedures that were being done by the consultants

Government is a parent to everyone in this country therefore it wants to work with its communities

A2.3.8 Community leaders FGD, TA Mwadzama VDC REPS

Venue: Chibothera Primary school

Facilitator: DAVID MTEKATHEKA

Note-taker: LILIAN LUCAS

Date: 02rd, DECEMBER, 2023

How many GVHs are under each VDC?

VDC	GVHs
CHIMBARO	Jinga, Chimbaro
Nkhala	Falawo, Ndimbwa, Nambela, Madzi, Pembeka
Ngwatha	Kanyangale, Chipula 1&2, Mchingariza, Ngwatha1&2, Zidyana, Nkhamba
Chiwoza	Nkhomba, Chiwoza
Malendewa	Chimodzi, Malendewa

	William	William
	Chongole 1	chongole 1&2, Chizongwe
	Chisaka	Kalongola, Nduwa, Kampala
	Chakaka	Manda Atema, Malizani, Kasaboka, Chiwoza
	Bango	Bango
	kabyanga	Ntachi1&2, Chibothela
	Fusani	Jamusi, Atambala, Chilenga, Katukusha, Silapa, Kasanja
	Benga 1	Kamango, Gome, Mawondo, Nkhukumila

What are the socio-cultural dynamic in the project affect communities in terms ethnicity and intermarriages, religious affiliations?

Ethnicity: The Chewa are dominant in this area as we also have Alikoma, Burundi, Yao, Tumbuka

Religion: we have more Christian (catholic, Anglican &CCAP) in this area comparing to the Muslims

The previous PAP survey showed that in the project area, there were more unmarried women who were either divorced or widowed; what factors could be attributed to this trend?

We have less men comparing to women

More men are dying comparing to women this is due to overthinking and depression that they usually end up killing themselves

Men don't usually stick to one woman as they move from one woman to another which usually ends in them contracting sexually transmitted diseases and led them to death

Communal or public service facilities that will be displaced by project works?

Communal/institutional asset/ nature of displacement	Location	Affected GVHs	Resettlement preferences
Borehole	Chiwongolelo 1	Chiwonge	The project should rebuild every borehole before they start the work The project should also add more boreholes in the community
Borehole	Shukran clinic	Chiwonge	
Borehole	Chizongwe 2	Chizongwe	
Borehole	Kapili	Zidyana, Chilapula1&2, Nkhamba	
Borehole	Nkhayika trading center	TA Mwasambo, TA Nkhanga, TA Kalimanjira	
Borehole	Chinkhwamba	Chiwoza, Ngoma	
Borehole	Joseph	Joseph	
Borehole	Mudoka	chiwoza	
Borehole	Njelwa	Njelwa, Pembela, Chakaka	
Borehole	Pyopyo	Chomveka, Jinga	
Borehole	Jinga	Chomveka, Jinga, Mapulanga, Chimbalu	Asking the chiefs on what to be done Asking the owners of the graveyard on what to do
Borehole	Chisaka 1	Chisaka 1	
Graveyard	Chia bridge	Chingole 1& 2	
Graveyard	Pathawa	Chizangwe	
Graveyard	Chibothela	Chibothela	
Graveyard	Mankhukwa	Mankhukwa	
Graveyard	Chomveka	Chomveka	

Graveyard	Nkhweza	Chisaka, Kavinjuri, Nduwa	Compensating them with cash
Graveyard	Kanongola	Kanongola	
Forest & trees	Kanongola	kanongola	Compensating the owners with cash
Forest & trees	Ntachi	Ntachi	
Forest & trees	Mbewe	Ntatchi	
Market	Chilongwe trading	chiwonge	Discussing with the people in the market on were best they can do Build another market for them Compensate them wit money
Market	Undi trading	Chiwongele	
Market	Chizongwe	Chizongwe 1	
Market	Nkhala fish market	Nkhala ,Dimbo, chiwoza, Nambela, Nambela	
Market	Madzi kusamba	Nkhala, M.Kusamba, Nambela	
Market	Malendewa	Falawo, William, Gome, Malendewa	
Market	Mangulanje	kabyanga	
Market	Chizongwe	Chizongwe 1	
Market	Undi trading	Chiwongole 2&3	
Block & fence	Asumu primarirly school		Rebuild the block and fence
Teachers house	Chinkhwamba	Chinkhwamba	Rebuild the house
Ground	Chisaka	Chisaka	Move the ground to a different place but close to the school
Mosque	Zidyani	zidyani	Compensate with cash Improvising a hospital by the project
Hospital	Health center	Zidyani, Chilupula1&2, Nkhamba	
Church	Roman catholic kapili	Zidyani, chiluewa 1&2, Nkhamba	
church	Baptist church kabyanga	Kabyanga	
Church	New apostolic church Mkayika Free Methodist	Chibothela	

What is the status of social services in the project area?

Social service area	Current status	Road project dynamics
Access to portable water	<p>People usually drink water from rivers and also dig their own unprotected shallow well</p> <p>The water sources are very far from the community</p> <p>Too many people in the area but few boreholes causing pressure on water</p>	<p>More boreholes will be destroyed hence causing more problems on water</p> <p>The project will bring dust to the area that can easily cause pollution to the water</p>

Health and sanitation	<p>We do not have free hospital as we have more private hospitals</p> <p>No health surveillance assistance in most areas</p> <p>Poor sanitation in most markets as there are no bins and toilets</p> <p>During the rainy seasons the toilets usually collapse due to the soft soil</p>	<p>The project should be pouring water throughout the diversion</p> <p>Once the projects begin they'll be different diseases due the dusty roads</p> <p>They should have a specific places were to dispose their waste and have enough toilets around there premises</p>
Primary and secondary education	<p>There are very few schools in the community and a lot of children who are attending these schools, they are not in enough for children</p> <p>Schools are very far from the community forcing more children not to attend to school</p> <p>Teachers wanting to leave in town instead of leaving close the school or near premises</p> <p>Moving skilled teachers from one school to another in the name of wanting to improve other schools, this ends up disturbing children</p>	<p>Having time tables on where and when the project is taking place at that particular time</p> <p>Sensitization to the children, parents, and teachers on this coming project</p> <p>Disturbance of education, so children will be distracted</p>
Early child development centers	<p>Low education, as they are only few CBSS in the area</p>	<p>Build them blocks and provide them with porridge</p> <p>Provide the teachers with skills that will help them teach these young ones</p>

What are your concerns regarding the process of identifying and compensating project affected persons in the area?

Issue Raised	Proposed redress
Lifyo bridge is being directed to people's houses that have not been registered, what is going to happen to these houses?	
Last time some people were compensated but those who were given the money did not have property while those who were registered were not given any compensation	
Let's follow up protocol and give the right information to the community as this will reduce conflicts in the community	The VDC shall be involved as even to help in directing other community members

	This is not the first time researchers coming through our communities, how sure are we this time around things will go right?	
	Which office should we go to when we have issues about the houses not being registered and the compensation?	The VDC should go to the district council, and they should be a certain community that is involved in this particular project
	They are mostly focused on houses, shops and trees, what about the farms?	
	The sensitization should have been done way before as to not come in surprisingly to people in the communities	

A2.3.9 Community leaders FGD, TA KALIMANJIRA VDC REPS

Venue: kalimanjira

Facilitator: David Mtekateka

Note-taker: Lilian Lucas

Date: 2st December, 2023.

How many GVHs are under each VDC?

	VDC	GVHs
1	Chikho	Kapanga 1, Chikho, Chikho 2, Akanyambo
2	Kalimanjira	Mano, Mberemera, Kalimanjira, Chiwula, Kapanga2, Mapumba, Kalusa, Chiwutula, Makuzi
3	Mutanga 1	Mutanga
4	Mutanga 2	Mutanga2, Chingamba

What are the socio-cultural dynamic in the project affect communities in terms ethnicity and intermarriages, religious affiliations?

Ethnicity: The Chewa are the most common people in our area followed by the Alikoma, Yao, Tonga and Lomwe

Religious: Muslims and Christians (Anglican, Last church, Baptist, Catholic, and Assembly)

Intermarriages: Different races marrying each other's

The previous PAP survey showed that in the project area, there were more unmarried women who were either divorced or widowed; what factors could be attributed to this trend?

We have a lot of women in our area comparing to men

Beliefs in churches, in a way that Muslims believe in marrying many wives and in the end they end up divorcing these women hence more women are left without husbands

Most men leave their wives behind as they go to South Africa

Organization are mostly supporting women by giving them loans which they use to start small business and once their husbands are not supporting their families, women leave them behind.

Once a man is not well to do women leave these men as they believe they can survive on their own

People do not value marriage in our areas, as it is easy to divorce

Communal or public service facilities that will be displaced by project works?

Communal/institutional asset/ nature of displacement	Location	Affected GVHs	Resettlement preferences
Anglican church	Munjayi	Mutonga2 and Chingamba	Compensation
Assembly church	Chia	Mutonga2	
Borehole	Chia trading	Mutanga 2and Chingamba	The borehole should be rebelt before the projects starts The project should also add more boreholes in the community
Borehole	Chia	Mutanga 2and Chingamba	
Borehole	Makozi	Mutanga	
Borehole	Chiwula	Chiwula	
Borehole	Kalimanjira	kalimanjira	
borehole	Kasiya	Chiwula and Kanyamo	
Graveyard	Kanyama	Kanyama 1, Kanyama2, Bwanakaya, Chimbalo, Salimu	Discussing with the chiefs Buy another area to make it a graveyard compensation
Graveyard	Kalimanjira	Kalimanjira	
Graveyard	Mudalempera	Kalimannjira, Mano. Nderemera	
Mosque	Makowa Chiwula Makumba	Mutanga 1 Chiwula Makumba	Compensation
Ground	Chia primarily school	Mutanga 1	Buy a new place clear it and make it a new ground
Market	Chinangwa fish market Makozi Kalimanjira Makumba trading	Mutonga Kalimanjira Kalimanjira Malala	Find them a new place and build them another market
Park	Makumba	Malala	Compensation in cash
Ngoza CBCC	Kanyambo	kanyamo	They should rebuild another one

			Compensation in cash
--	--	--	----------------------

What is the status of social services in the project area?

Social service area	Current status	Road project dynamics
Access to portable water	Too many people in the area but we only have few boreholes this usually led to conflicts among community members During intense sunlight, the water level decreases in most of the boreholes hence the water stops. For instance Kalimanjira, Chikho and many more.	The project to drill new borehole before they start with the project as most of the people depend on these boreholes The project should be providing water to the community through water boozers This project will bring more problems on water for instance more pressure on water sources
Health and sanitation	No toilets and bins in some households, markets and trading centers We do have enough Health Surveillance Assistance Shortage of medicine in hospitals Hospitals are far from where most people leave	Provisions of toilets, bins and every household in the community should be forced to have a toilet To provide a hospital that is free of charge People will be at risk of different diseases due to the dust caused by the machines Pouring of water in the communities once in a while to reduce these dusty places Mobilizing chiefs and the community on when the project is going to start The health surveillance assistance to be teaching people on sanitation while going around their households
Primary and secondary education	There are no enough teachers and materials Congestions in schools Children going long distances to get to schools, there only few schools in the area. For	Children will be destructed during the road construction Sensitization in churches by priests on the project and warning people to take care of their children

	instance, they is only one secondary school in the area Children are forced to start schools at a late stage usually at the age of ten	that incase one is found in these were the project is occurring shall will fine. Putting humps and involving someone to teach these children on how to cross the road
Early child development centers	Parents do not see the importance of these centers All the child development centers are private and these private centers can be affordable by everyone	Children will be forced to stop going to school Build houses for them

What are your concerns regarding the process of identifying and compensating project affected persons in the area?

Issue Raised	Proposed redress
Why were people with trees compensated while those with farms were not compensated?	We not sure if people will be compensated or not
Are those people leaving around that area going to be hired or are they the ones who will be working on this project	All land within 30M belongs to the government hence it's up to them to decide if to give compensation or not
In the first place you were compensated for the 15M lane and now you have been found in the 30M lane, are you still going to be compensated?	The VDC should follow on any updates about incoming project
This research started way back and a number of our properties were destroyed, how sure are we that this time around its serious	These are two different projects if the first one failed it means it has stopped as for this one is a new project and expect to see it soon
People do not know their land limits along the road as most of them just inherited from parents	Sensitization, people should know where exactly to build their houses, plant trees and many more.
what channel do you use to give out money?	
Most people who received compensation last time had no properties along the road and the money given wasn't worth the property	

This is the first time the researchers have gone through the VDC as they have involved them in knowing what is coming their way in a project, which is an amazing process and it will help in stopping or reducing too many conflicts

ANNEX 3: EVIDENCE OF STAKEHOLDER CONSULTATED

A3.1 National Level Stakeholders

A4.2 District Level Stakeholders

A4.3 Community Level Stakeholders

A4.4 Pictures of District Stakeholders

Meeting with Nkhotakota DESCC

Focus Group Discussion with Nkhotakota Youth

A4.5 Pictures of community Stakeholders

ANNEX 4: MANAGEMENT STRATEGIES AND IMPLEMENTATION PLANS (MSIPS)

ANNEX 4.1. CODE OF CONDUCT

Code of Conduct: Environmental, Social, Health and Safety (ESHS)

This Code of conduct will identify risks associated with: environmental and social management, labor influx, spread of communicable diseases, sexual harassment, sexual exploitation and abuse gender based violence, illicit behavior and crime, child labour, and safety.

The Code of Conduct contains obligations to all project staff (including sub-Contractors and day workers) in minimum specific requirements as follows:

- a) The supervising consultant shall ensure that the Contractor comply with applicable Laws, Rules and Regulations of the jurisdiction.
- b) The supervising consultant shall ensure that the Contractor prepared specific Health and Safety Management Plan (HSMP), Specific Environmental and Social Management Plan (ESMP), HIV/AIDS awareness programme, Road Safety Awareness Programme, Occupational Health and Safety Awareness Programme of the proposed project prior to the actual execution of the construction works based on the Design and Environmental and Social Impact Assessment Reports.
- c) The supervising consultant shall ensure that the Contractor comply with applicable health and safety requirements (including wearing prescribed Personal Protective Equipment (PPE), preventing avoidable accidents and a duty to report conditions or practices that pose a safety hazard or threaten the environment).
- d) The supervising consultant shall ensure that the contractor provided temporary speed calming measures, temporary speed limit signs to the highly populated areas such as at road sections under construction, approach to trading centers, villages, school premises and health centers and ensure that drivers observe speed limits for safety of other road users.
- e) The supervising consultant shall ensure that the contractor avoid unnecessary clearance of trees and vegetation, avoid conflicts of water resources use with respective communities.
- f) The supervising consultant shall ensure that the contractor make every effort to avoid water, air, soil pollution, land degradation and any related harmful that can damage

the environment. Also all construction activities should strive to attain the high environmental standards.

- g) The supervising consultant shall ensure that the contractor comply to safety of its workers and experts by providing them the required Personal Protective Equipment (PPE) to ensure safety. The standard safety signs and road marking should be provided during and after completion of road construction activities to ensure safety for all road users.
- h) The supervising consultant shall ensure that the contractor provides sanitations facilities along the construction corridor (for example, to ensure workers use safe drinking water, specified decent sanitary services provided by their employer and not open areas).
- i) The supervising consultant shall ensure that after completion of construction activities the contractor have made landscape and reinstate all the damaged areas through tree and grass planting to control soil erosion. Among others, such damaged areas are borrow pits, quarry sites, road diversion, stockpiled material yards, workshop, crusher sites, batching plant, asphalt mixing plant, water dams or reservoir, waste dump area and used fresh/fuel oils storage areas and campsites along the construction corridor.
- j) The supervising consultant shall ensure that the contractor do not practice any kind of discrimination (for example to job seekers on the basis of family status, ethnicity, race, gender, religion, language, marital status, birth, age, disability, or political conviction).
- k) The supervising consultant shall ensure that the contractor adhere to the labour laws during labour recruitment to ensure skilled and unskilled laborers are given specified work Contracts.
- l) The supervising consultant shall ensure that the contractor refrain from sexual harassment (for example, to prohibit the use of abusive language or filthy behavior, in particular towards women or children, that is sexually provocative, demeaning or culturally inappropriate).
- m) The supervising consultant shall ensure that the contractor refrain from any violence or exploitation (for example, the prohibition of the exchange of money, employment, goods, or services for sex, including sexual favors or other forms of humiliation, degrading or exploitative behavior).

- n) The supervising consultant shall ensure that the contractor and its subsidiaries do protect children (including prohibitions against child labor, abuse, defilement, or otherwise unacceptable behaviors with children, and ensuring their safety in project areas).
- o) The supervising consultant shall ensure that the contractor avoid conflicts of interest (such that benefits, contracts, or employment or any sort of preferential treatment or favors, are not provided to any person with whom there is a financial, family, or personal connection).
- p) The supervising consultant shall ensure that the contractor protect, provide safe equipment's and proper use of construction properties found along construction corridor and campsites (for example, to prohibit theft of construction equipment and material, carelessness or waste).
- q) The supervising consultant shall ensure that there is non-retaliation against workers who report violations of the Code, if that report is made in good faith.
- r) The supervising consultant shall ensure that all workers and contractor's experts are responsible to read, accept and sign the requirements of this Code of Conduct as condition of employment and any violation of this Code can result to serious contractual measures to be taken including contract termination, dismissal, or referral to legal authorities.

CONTRACTOR CERTIFICATION:

I agree/I do not Agree.....

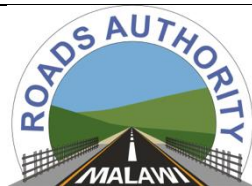
Name and Signature of an Authorized Person of the Company.....

Name of the Company.....

Address of the Company.....

Address and Stamp of the Company

ANNEX 4.2. COVID-19 INFECTION PREVENTION PLAN



Accelerating Malawi's Economic Growth

ROADS AUTHORITY

Guidelines on Prevention of Spread of COVID-19 in the Road Sector

Roads Authority

P/Bag B346

Lilongwe 3

July 2020

(Revision No.1)

Foreword

The development of the guidelines for the prevention of COVID-19 reflects the Roads Authority's commitment to safeguarding the health of all workers in the road construction sector and the public. The Roads Authority recognises the impact that COVID-19 will have on the sector if it is not checked.

The purpose of these guidelines is to define measures to be put in place on all Roads Authority projects to respond to and prevent the spread of COVID-19 at construction sites and campsites.

The preventive measures advanced in these guidelines have been developed in consultation with all relevant stakeholders such as Ministry of Health and Ministry of Labour, Skills and Innovation. It is vital that these measures are implemented on all Roads Authority projects to ensure the safety and wellbeing of workers.

We all must play a role in this fight if we are to stop the spread of COVID-19.

Chief Executive Officer

1.0 Introduction

In January 2020 the World Health Organization (WHO) declared the outbreak of a new coronavirus disease in Hubei Province, China to be a Public Health Emergency of International Concern. The Corona Virus has spread to all corners of the world.

In Malawi the number of confirmed COVID-19 cases and number deaths continue to rise by the day. The Government adopted and published measures contained in the Public Health (Corona Virus Containment, Prevention and Management) Rules, 2020 to control the spread of the virus and contain the Pandemic. These Guidelines are therefore developed in line with the Public Health Rules and World Health Organisation and International Labour Organisation recommendations on the prevention of COVID-19.

2.0 Purpose of the Guidelines

The purpose of these guidelines is to define measures to be put in place on all Roads Authority projects to respond to and prevent the spread of COVID-19 at construction sites and campsites.

3.0 Users of these Guidelines

These guidelines are developed for all road projects by the Roads Authority. The guidelines will be used by;

- All consultants (resident engineers and their workers) for road projects
- All contractors for road projects and their workers in their offices and campsites
- All subcontractors for roads projects and their workers in their offices and campsites.

4.0 How COVID-19 is spread

COVID-19 is spread when someone who is infected coughs or sneezes releasing droplets of infected fluid. Most of these droplets fall on nearby surfaces and objects such as desks, tables, telephones or equipment. People can catch COVID-19 by touching contaminated surfaces or objects and then touching their eyes, nose or mouth. People can also catch COVID-19 if they are standing within one meter of a person with COVID-19 by breathing in droplets coughed out or exhaled by the infected person.

Most persons infected with COVID-19 experience mild symptoms and recover. However, some go on to experience more serious illness and in some cases resulting into death. The risk of serious illness increases with age and/or underlying health conditions. People over the age of 40 seem to be more vulnerable than those under 40. People with weakened immune systems and people with conditions such as diabetes, heart and lung disease are also more vulnerable.

5.0 Measures for the Prevention of COVID-19

The measures below will help prevent the spread of infections at workplace, construction sites and campsites. These measures have been developed in consultation with the Ministry of Health and the Ministry of Labour, Skills and Innovation. The measures are as follows:

1. Make sure workplaces / Campsites are clean and hygienic. Surfaces (e.g. desks and tables) and objects (e.g. telephones, keyboards and equipment) need to be washed with soap and water or wiped with disinfectant regularly. Provide garbage disposal facilities including facilities for non-reusable PPE (used face masks).
2. Promote regular and thorough hand-washing by all workers. Place hand-washing facilities at strategic locations on the workplace/campsite/construction site to ensure that workers have access to places where they can wash their hands with soap and water regularly.
3. Improve Occupational Health and Safety (OHS) measures. Provide protective equipment for all workers (face masks). All workers to be provided with face masks. Visitors not wearing face masks should not be permitted on the campsites and construction sites. Observe Social Distancing by avoiding close contact (distance not less than 1 meter) with other people at the workplace at all times.
4. Suspend all formal contact/ face to face meetings, gatherings and conferences in line with the Public Health (Corona Virus Containment, Prevention and Management) Rules, 2020
5. Allow all vulnerable workers including those with underlying health conditions to work from home (where possible) or stay at home. These include people with weakened immune systems and people with conditions such as diabetes, heart and lung disease and older workers.
6. Encourage appropriate flexible working arrangements, such as smaller and shorter working shifts.
7. Reduce number of people at the construction site and living on campsites. Only key personnel should be onsite and ensure that social distancing is observed at all times. Avoid gatherings of more than 5 people.
8. Display posters promoting hand-washing and all other measures in these guidelines. Request your District Health Office for these posters. Combine this with other communication measures such as offering guidance from OHS officers to promote these measures.
9. Check the temperature of all employees twice a day. Those with a low grade fever (temperature of 37.3 oC or more) should be taken to the hospital for more tests. Visitors with a fever should not be permitted on site.
10. All workers who have tested positive for Covid 19 should be isolated. They should not report for work until they have fully recovered.
11. All workers who have been in contact with an infected person should get tested and self isolate for 14 days.
12. Employees who have returned from other countries should self-isolate and monitor themselves for symptoms for 14 days and take their temperature twice a day. If they develop even a mild cough or low grade fever (i.e. a temperature of 37.3 oC or more), they should go to the nearest

hospital for more tests

13. Provide transport for all employees between the worksite and the campsite.
14. For more information, telephone on a toll-free, Ministry of Health number 54747.

6.0 Review of the COVID-19 Guidelines

These guidelines shall be reviewed by Roads Authority when deemed necessary and in line with any addition or relaxation of the measures by the Government of Malawi.

(Revision No.1)

ANNEX 4.3: TRAFFIC MANAGEMENT PLAN (TMP)

INTRODUCTION

Construction of Benga - Dwangwa M005 road section will involve the movement of construction vehicles, equipment, and personnel to facilitate various project tasks. This Traffic Management Plan (TMP) outlines the potential traffic issues and risks, along with mitigation measures, to ensure the safe and efficient flow of traffic during the project.

SCOPE

The TMP covers the provision of traffic controllers, installation of temporary signs, road markings, and safety barriers. It also includes the maintenance of the existing road corridor, including road bypasses used for temporary traffic diversion throughout the project's duration.

PURPOSE

The purpose of this TMP is to ensure the safe passage of public traffic and maintain a smooth flow of traffic during construction of Benga - Dwangwa M005 road section. It aims to achieve project objectives while minimizing impacts on the road network, ensuring worker and public safety, and protecting the environment from pollution.

OBJECTIVE

The objective of this TMP is to describe the measures in place for managing vehicles and pedestrian traffic during the project. The plan aims to deliver a safe environment for workers and the public, minimize adverse impacts on traffic flow, respect and protect the communities, and ensure all vehicles are in good working order.

AIM

The aim of this plan includes:

Providing continuous, safe, and efficient movement of traffic for both the public and workers;

Protecting workers from passing traffic and work equipment;

Ensuring access to properties located within the project limits; and

Designing, constructing, maintaining, and removing necessary temporary bypasses and detours.

ROLES AND RESPONSIBILITIES

The Site Engineer

Ensure compliance with the Project Specification documents.

Allocate adequate project resources to traffic management.

Secure senior management support for the plan.

Give priority to safe traffic management in project delivery.

Provide suitable training for responsible personnel.

ESHS Expert

Implement and maintain the Traffic Management Plan.

Conduct regular inspections and audits of traffic control measures.

Identify areas of traffic congestion or unsafe conditions and recommend improvements.

Provide technical advice on traffic management and road safety.

Liaise with internal and external stakeholders on traffic management and safety.

Conduct traffic awareness sessions for site personnel.

Monitor the implementation and operation of temporary roadwork signage.

Site Foremen

Support the Traffic Management Plan in day-to-day duties.

Ensure efficient communication between construction and traffic management requirements.

Coordinate the installation and maintenance of traffic devices.

Monitor and control procedures and site rules associated with traffic devices.

Plan construction works considering traffic management requirements

TRAFFIC CONTROL DEVICES/FACILITIES

Facility name	Number	Remarks
Guide boards and civilized expressions		
Temporary signage		
Taper mark		circular
Taper mark		square
Reflective Vest		
Barricades		
Traffic cones		

IMPLEMENTATION

All road users must show due care, attention, and caution to avoid endangering or obstructing traffic. Construction site foremen will conduct detailed site inspections to identify points for installing traffic management devices to ensure the safety of road workers and users. Temporary works, traffic control devices, and all related measures will be designed, constructed, and maintained to meet the Scope of Works requirements.

DESIGNATED ROUTES

The Engineer and Contractor will agree on routes for construction vehicles. Road safety campaigns will be intensified, road reserve regulations enforced, and local communities sensitized against theft/vandalism. Adequate signage will be provided, stakeholders will be involved throughout the project stages, and efforts will be made to reinstate the natural environment where feasible.

SAFETY BARRIERS

Safety barriers will be installed to protect work areas, pedestrians, and vehicles. The chosen safety barriers will conform to accepted standards. Barricades will be used to reroute pedestrian and traffic flow away from deep excavations and hazardous spots. They will mark the limits of work areas during construction.

TEMPORARY SIGNAGE

Road closures resulting in alternating flow will be avoided whenever possible to minimize traffic disruption. Construction vehicle movements, particularly truck movements, will be managed to reduce the impact on road capacity. Informative signs, speed limits, site hazard warnings, and reflective cones will be used in various work zones to guide and inform road users.

PUBLIC AND COMMUNITY TRANSPORT

The local transport services may experience minor or major impacts depending on the bypasses created and speed limits implemented. Safety briefings will inform truck drivers to be extra cautious near sensitive areas and to watch for pedestrians, cyclists, and children.

MONITORING

The ESHS Expert will visually monitor the signs and keep a sign movement sheet to record their usage on-site. Regular inspections and audits of traffic control measures will ensure their effectiveness and compliance with safety requirements.

DEFINING SIGNAGE

The adopted signage color code is yellow background, black letters, and red boundaries. The colors will be used to warn road users of dangerous conditions, alert them to unusual conditions, and guide their way.

ANNEX 4.4. BORROW PIT MANAGEMENT AND RESTORATION/REHABILITATION PLAN

Introduction

Most construction projects require earthworks such as land clearing and excavations such as creation of borrow pits for the purpose of extracting construction materials. These works give rise to a number of issues such as the risk of accidents, soil erosion, and creation of gullies. Excavations like borrow pits can serve as hazards, posing dangers to individuals, especially children. Additionally, they can accumulate water during the rainy season, becoming potential breeding grounds for disease vectors like mosquitoes. It is crucial for construction of Benga - Dwangwa M005 road section to have a robust system in place to restore the cleared and excavated land.

The Borrow Pit Management and Restoration/Rehabilitation Plan for the construction of Benga - Dwangwa M005 road section is a vital component of commitment to responsible construction practices. This plan outlines the strategies and procedures to be implemented for the responsible extraction of construction materials from borrow pits. The aim is to minimize environmental impact, ensure compliance with contractual specifications, and restore borrow pit areas to their natural state after utilization.

Purpose

To provide guidance on restoring degraded land forms due to project activities associated with construction of Benga - Dwangwa M005 road section.

Scope

This plan addresses land degradation issues, risks, and adverse impacts resulting from project activities such as construction material extraction from borrow pits. It also includes mitigation measures, monitoring indicators, frequency, and responsible persons for monitoring the mitigation measures.

Objectives

Ensure that virgin or disturbed land from which construction materials are extracted is reinstated to its original or close to its original state.

Fill up all excavations with stockpiled topsoil.

Borrow Pit Identification and Assessment:

As part of the preliminary preparations, we will identify potential borrow areas along the project road route.

A detailed soils and materials survey will be conducted to determine the suitability of these borrow pits. This survey will include assessments of material quality and quantity.

The materials investigation report provided by the Contracting Authority will serve as a guide for the assessments.

Environmental Impact Minimization:

To minimize environmental impact, we will implement a strict management approach during excavation. This includes adopting best practices for soil and material extraction, handling, and transportation.

Adequate sediment control measures will be put in place to prevent soil erosion and sedimentation in nearby water bodies.

Dust control measures will be implemented to reduce airborne dust emissions and maintain air quality.

We will ensure compliance with all relevant environmental regulations and permits.

Materials Quality Assurance:

Materials extracted from borrow pits will be tested to confirm compliance with the contract specifications. This includes testing for material composition, size, and quality.

Stockpiling facilities will be established to store materials in advance, allowing for testing and quality assurance prior to their use in construction.

Restoration and Rehabilitation:

Once the borrow pits are no longer needed, the contractor will initiate the restoration and rehabilitation process.

This process will involve the regrading of the borrow pit area to its original contours and the removal of any construction-related debris or waste.

If required, native vegetation will be replanted to restore the area to its natural state.

All restoration and rehabilitation activities will be conducted in accordance with applicable environmental and regulatory requirements.

Monitoring and Reporting:

Regular monitoring of borrow pit activities will be carried out to ensure compliance with this plan.

Any deviations from the plan or unexpected environmental impacts will be reported promptly to the relevant authorities.

We are committed to transparent reporting and accountability throughout the project.

Table 1 of Annex 4.4: Mitigation and Rehabilitation Measures for Degraded Areas

Item No.	Impact	Mitigation Measure	Monitoring Indicators	Means of Verification	Frequency	Responsibility for Monitoring
1	Unauthorised entry from surrounding community members, especially children	- Barricading the site with danger tape to bar access by unauthorized persons	- Availability of danger tapes at the site	- Visual inspection	Daily	Contractor
		- Sensitizing community members on the dangers of accessing dangerous work environments	- Number of sensitization meetings			Nkhota-kota District council and Contractor
2	Conflicts between Contractor and the landowners related to the land	- Acquire the land through proper means - agreements with the landowners	- Presence of signed agreement forms	- Land acquisition records	Quarterly	Nkhota-kota District council and Contractor
3	Accumulation of stormwater in excavations that	- Drain all stormwater collected in excavations and fill up all excavations	- Number of excavations filled up			

Item No.	Impact	Mitigation Measure	Monitoring Indicators	Means of Verification	Frequency	Responsibility for Monitoring
	may serve as breeding sites for vectors	after extracting the construction materials				

ANNEX 4.5. VEHICLE CHECKLIST

Daily Vehicle Inspection

Date: ___/___/___ Vehicle #: _____ Mileage: _____ Next Service: _____

Please place an X next to any item that needs attention, a check [✓] next to the rest

-
- | | |
|------------------------------------------------------------------------------------|-------------------------------------------------------------|
| <input type="checkbox"/> Visual inspection of exterior and leaks under the vehicle | <input type="checkbox"/> Check tires for wear and pressure |
| <input type="checkbox"/> Leaks in the engine compartment and any loose objects | <input type="checkbox"/> Check horn and motion/reverse beep |
| <input type="checkbox"/> Oil level | <input type="checkbox"/> Check windshield wipers/washers |
| <input type="checkbox"/> Coolant level | <input type="checkbox"/> Check brake lights |
| <input type="checkbox"/> Power steering fluid level | <input type="checkbox"/> Check turning lights |
| <input type="checkbox"/> Seatbelt working | <input type="checkbox"/> Mirrors and adjustments |
| <input type="checkbox"/> Spare tire, jack and wheel spanner | <input type="checkbox"/> Check for first aid kit |
| <input type="checkbox"/> Start engine and check for air gauge | <input type="checkbox"/> Check for fire extinguisher |
| | <input type="checkbox"/> Check adequate tie-downs |

Comments:

Driver's Name: _____
Signature: _____

Supervisor's Name: _____ Supervisor
Signature: _____

ANNEX 4.6. WASTE MANAGEMENT PLAN

Introduction

The Waste Management Plan for the construction of Benga - Dwangwa M005 road section is designed to address the responsible management of waste generated during the construction process. This plan outlines comprehensive strategies for waste collection, separation, recycling, and proper disposal in strict accordance with local regulations and environmental standards. The commitment to efficient waste management is not only to comply with legal requirements but also to minimize environmental impact and promote public health and safety.

Waste Management and Environmental Regulations:

We acknowledge the relevance of the Local Government Act of 1998, Second Schedule, which delineates various environmental protection functions, waste management, nuisance control, control of hazardous materials, and building standards. Compliance with these regulations is a top priority.

Waste Generation and Types

Construction activities inherently generate various types of waste, including solid waste, liquid waste, and bio-and non-biodegradable waste. It is essential to acknowledge that improper waste management poses risks such as environmental pollution and disease transmission through vectors like mosquitoes and flies.

Solid Waste Management:

To manage increased solid waste, we will:

Procure and place waste receptacles strategically around the construction site.

Implement waste segregation at the source.

Ensure that waste is properly sorted and separated into different categories, including recyclables and non-recyclables.

Monitor the volume of recyclables generated.

Measures to Address Increased Risk of Air Pollution

Prohibition of waste burning.

Measures to Address Pollution of the River by Oils, Bitumen Spillages, and Hazardous Wastes

To prevent pollution of rivers by oils, bitumen spillages, and hazardous waste:

Implement spill clean-up procedures to ensure no spills are left uncleaned.

In coordination with the district council designated waste dumping sites for proper disposal will be identified.

Provision of drip pans at dispensing points for oil and fuel to prevent spillage.

Installation of adequate bund walls to contain oil and fuel spillages.

Proper disposal of construction wastes in designated areas.

Establishment of appropriate and adequate sanitation systems in workers' camps to prevent the spread of waterborne diseases.

Monitoring and Reporting:

Verification of the presence and functionality of sanitary systems.

Regular inspections to ensure no waste spills are left uncleaned.

Monitoring the presence of impervious surfaces in areas handling oils and fuels.

Documentation of used oil recycling efforts.

Documentation of the number of waste receptacles strategically placed.

Tracking the percentage of waste properly sorted and separated into different categories (e.g., recyclables, non-recyclables).

Measurement of the volume of recyclables.

Waste Disposal Protocol:

The Waste Management Plan is comprehensive and aligns with regulatory requirements:

We will adhere to the Waste Management Regulations 2008 and local bylaws for waste disposal, following all guidelines for different waste categories.

Waste generated during construction will be disposed of offsite at a designated dumping site in consultation with the Nkhota-Kota District Council.

Burning of any waste on the construction site is strictly prohibited.

Waste bins will be provided at the campsite and work locations for construction personnel.

Bins will be equipped with lids and external closing mechanisms to prevent spillage and to be scavenger-proof.

Personnel will be required to immediately deposit all waste in the provided bins for daily removal.

Bins will be emptied daily, and waste will be transported to a temporary waste storage yard/site until final disposal.

Bins will be color-coded for waste segregation and will exclusively be used for waste storage.

Compliance with Regulations:

The contractor commits to ensuring that no noxious or offensive substances are emitted into the air, land, or water.

Compliance with the Waste Management Regulations 2008 and local bylaws will be strictly followed for the disposal of various waste types, including empty cement bags, construction/demolition waste, combustion products, dust, metals, rubble, and timber.

Conclusion:

The Waste Management Plan for the construction of Benga - Dwangwa M005 road section reflects the commitment to responsible and sustainable construction practices. By following the outlined strategies and protocols, we aim to not only meet legal requirements but also minimize the environmental impact of the project. We are dedicated to ensuring public health and safety, protecting the environment, and complying with all relevant regulations throughout the construction process.

ANNEX 4.7. EMERGENCY PREPAREDNESS AND RESPONSE PLAN

Introduction:

The Emergency Preparedness and Response Plan for the construction of Benga - Dwangwa M005 road section is a critical component of Contractor commitment to the safety and well-being of Contractor workers, the surrounding community, and the project as a whole. This plan outlines procedures and protocols for effectively managing various emergencies that may arise during construction, including accidents, natural disasters, or unforeseen events. Contractor goal is to ensure the swift and organized response to emergencies, ultimately minimizing harm and safeguarding lives and property.

1. Emergency Contacts and Communication:

An emergency contact list will be maintained, featuring key personnel, including the project manager, first aiders, and designated emergency response coordinators.

Contact information for local emergency services, such as the Nkhota-Kota District Health Office and local authorities, will be readily accessible.

All employees will be informed about the designated contact person for emergencies, whose information will be prominently displayed on notice boards.

2. First Aid and Medical Support:

A well-stocked and regularly maintained first aid box will be available at the construction site.

A trained and certified first aider will be present on-site to provide immediate support for minor injuries and medical emergencies.

For major health emergencies, arrangements will be made with the nearest Health Centre for timely medical support and evacuation.

3. Emergency Preparedness Planning:

A comprehensive emergency preparedness plan will be developed, outlining specific procedures, roles, and responsibilities in the event of various emergencies after establishment of the campsite.

The plan will be regularly reviewed, updated, and shared with all relevant stakeholders.

Employees will be trained in emergency response procedures, including evacuation, first aid, and communication protocols.

4. Evacuation Procedures:

Evacuation routes and assembly points will be clearly identified and communicated to all workers.

Regular evacuation drills will be conducted to ensure that all personnel are familiar with the procedures.

Special attention will be given to the safe evacuation of vulnerable groups, including those with mobility challenges.

5. Fire Safety:

Fire prevention measures, including the proper storage and handling of flammable materials, will be in place.

Fire extinguishers will be strategically located, and workers will receive training on their use.

6. Reporting and Documentation:

All employees are responsible for promptly reporting any incidents or potential emergencies to their immediate supervisors.

Incident reports will be documented and investigated to prevent future occurrences.

Conclusion:

The Emergency Preparedness and Response Plan underscores the projects commitment to the safety and well-being of all individuals involved in the construction of Benga -

Dwangwa M005 road section . By implementing these procedures and protocols, aim to be fully prepared to handle emergencies effectively and minimize potential harm. Regular training, communication, and drills will ensure that all workers are well-prepared for any unforeseen event. This plan will be regularly reviewed and updated to reflect best practices and ensure the highest level of safety for everyone involved in the project

ANNEX 4.8. OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT PLAN

Introduction:

The Occupational Health and Safety (OHS) Management Plan for the construction of Benga - Dwangwa M005 road section is a fundamental commitment to ensuring the well-being and safety of all workers on the construction site. This plan outlines comprehensive strategies and measures to create a safe working environment, prevent accidents, and promote the overall health and safety of the workforce. The goal is to fully comply with the Occupational Safety, Health, and Welfare Act, 1997, and other relevant regulations while maintaining a culture of safety and well-being.

Regulatory Compliance:

Contractor will adhere to the provisions of the Occupational Safety, Health, and Welfare Act, 1997, and any other relevant national and local safety regulations.

A designated ESHS officer will ensure that all legal requirements are met and that the workplace remains compliant.

Hazard Identification and Risk Assessment:

Regular hazard identification and risk assessment will be conducted to identify potential workplace hazards and evaluate associated risks.

Hazardous areas and processes will be clearly marked, and controls will be implemented to mitigate risks.

Safety Training:

All employees will receive comprehensive safety training to ensure that they are aware of and capable of safely executing their tasks.

Specific training programs will be provided for high-risk tasks and operations.

Protective Equipment (PPE):

Appropriate personal protective equipment (PPE), such as helmets, gloves, safety glasses, and high-visibility vests, will be provided to all workers.

The proper use and maintenance of PPE will be enforced, and regular inspections will ensure that PPE remains effective.

Reporting and Incident Management:

Employees are encouraged to report any unsafe work situations or hazards they encounter.

An incident reporting procedure will be in place to document and investigate incidents, with corrective actions implemented to prevent recurrence.

Emergency Response:

Emergency response plans will be established for various scenarios, including fires, chemical spills, and medical emergencies.

Regular drills and training will ensure that all personnel are familiar with emergency procedures.

Safe Work Procedures:

Safe work procedures will be developed and communicated to workers for all tasks, with a particular focus on high-risk activities.

Regular safety meetings will be held to reinforce safe work practices.

Employee Rights and Responsibilities:

Workers will be informed of their right to remove themselves from any work situation that they reasonably believe presents an imminent and serious danger to their life or health.

Management will respect and support employees in exercising this right.

Hygiene and Amenities:

Workers will have access to clean potable water and sanitary facilities.

Adequate amenities, including rest areas and shelter from adverse weather conditions, will be provided.

Conclusion:

The Occupational Health and Safety Management Plan demonstrates projects commitment to ensuring the safety and well-being of all individuals involved in the construction of Benga - Dwangwa M005 road section. By implementing these comprehensive measures, aim to create a workplace where safety is paramount and where every employee is empowered to work in a safe environment. This plan will be regularly reviewed and updated to reflect best practices and ensure the highest level of safety for everyone on the project site.

ANNEX 4.9. PUBLIC HEALTH AND SAFETY MANAGEMENT PLAN

Introduction:

The Public Health and Safety Management Plan for the construction of Benga - Dwangwa M005 road section underscores the projects commitment to ensuring the safety and well-being of the local community. This plan focuses on measures to protect public safety and health during construction, including the prevention of public access to hazardous areas, maintaining cleanliness, and managing construction-related nuisances. The projects goal is to minimize disruptions to the local community while actively addressing potential challenges that may arise.

Community Awareness and Engagement:

Contractor will engage with the local community to raise awareness of the project's scope, timeline, and potential impacts.

Regular communication channels will be established to address community concerns and provide updates on project progress.

Security and Safety Measures:

Given the anticipated influx of people into the project area, Contractor will implement security measures to ensure public safety.

Security personnel will be deployed to deter negative social behaviors such as theft, prostitution, and harassment, thereby mitigating potential health and safety risks.

Traffic Management:

To manage the increase in the number of vehicles and machines, a comprehensive traffic management plan will be put in place.

Clear signage, traffic cones, and speed limits will be enforced to maintain safe traffic flow.

Prevention of Unauthorized Access:

Hazardous areas within the construction site will be secured to prevent unauthorized access by the public.

Fencing and warning signs will be installed to clearly demarcate restricted areas.

Dust and Noise Control:

Measures will be taken to minimize dust emissions from construction activities, including the regular sprinkling of water on access roads.

Noise levels will be monitored, and noise barriers will be used where necessary to minimize noise disturbances to the community.

Waste Management and Cleanliness:

Strict waste management procedures will be implemented to ensure the cleanliness of the project area.

Waste receptacles will be placed at strategic locations, and regular clean-up activities will be conducted.

Emergency Response for the Community:

An emergency response plan will be in place to address any unforeseen events or incidents that may affect the local community.

The community will be educated on emergency procedures and how to seek assistance in case of emergencies.

Health Promotion:

Health promotion initiatives will be launched to encourage healthy behaviors within the community.

Awareness campaigns on diseases prevention, including HIV/AIDS, will be conducted to promote public health.

Monitoring and Reporting:

Regular monitoring of public health and safety measures will be conducted to ensure their effectiveness.

Community feedback and concerns will be documented and addressed in a timely manner.

Conclusion:

The Public Health and Safety Management Plan reflects projects dedication to safeguarding the well-being of the local community during the construction of Benga - Dwangwa M005 road section. By implementing these measures and engaging with the community, aim to ensure that public health and safety are top priorities throughout the project. This plan will be regularly reviewed and adapted as needed to address the specific needs and concerns of the community, fostering a positive and safe environment for all.

ANNEX 4.10. CAMP SITE MANAGEMENT PLAN

Introduction:

The Camp Site Management Plan for the construction of Benga - Dwangwa M005 road section is designed to provide a safe, comfortable, and well-managed environment for project personnel. This plan addresses the establishment and management of construction camps, ensuring that accommodation, water supply, sanitation, and security are all in place to support the well-being and efficiency of the project team. Additionally, it takes into account the diversity of personnel and the need for proper waste management and mitigation of potential adverse impacts.

Campsite Establishment:

Campsites will be strategically located to provide convenient access to the construction site while minimizing environmental impact.

Layout plans will be developed to allocate areas for accommodation, catering, recreation, and other essential facilities.

Accommodation:

Adequate and comfortable accommodation will be provided for all campsite residents.

Accommodation will be gender-segregated, and separate facilities will be available for different staff categories.

Water Supply:

A reliable and potable water supply system will be established to meet the daily needs of campsite residents.

Water sources will be regularly tested to ensure water quality and safety.

Sanitation Facilities:

Sanitary facilities, including toilets and showers, will be provided to maintain hygiene and well-being.

Facilities will be cleaned regularly and maintained in good working condition.

Waste Management:

Proper waste management procedures will be implemented to ensure a clean and sanitary campsite.

Waste receptacles will be strategically placed, and regular waste collection and disposal will be conducted.

Security Measures:

Security personnel will be stationed at the campsite to ensure the safety and security of all residents.

Security protocols will be established to manage access and monitor the campsite perimeter.

Cultural Sensitivity:

The campsite will accommodate individuals from diverse backgrounds and cultural beliefs. Training and awareness programs will be conducted to promote tolerance, respect, and understanding among campsite residents.

Health and Wellness:

Health and wellness programs will be provided to support the physical and mental well-being of campsite residents.

First aid and medical support will be readily available in case of emergencies.

Environmental Impact Mitigation:

Measures will be implemented to mitigate potential adverse impacts of the campsite on the environment.

Environmental monitoring will ensure compliance with regulations and best practices.

Community Engagement:

We will engage with the local community to address any concerns related to the campsite and take proactive steps to mitigate any potential negative impacts.

Conclusion:

The Camp Site Management Plan reflects project commitment to providing a safe and comfortable environment for all project personnel during the construction of Benga - Dwangwa M005 road section. By implementing these measures, aim to foster a sense of well-being and community while mitigating any potential adverse impacts on the environment. This plan will be regularly reviewed and adapted as needed to address the specific needs and concerns of campsite residents and the local community, ensuring a positive and harmonious living and working environment for all.

ANNEX 4.11. LABOR MANAGEMENT PLAN

Introduction:

The Labor Influx Management Plan for the construction of Benga - Dwangwa M005 road section addresses the influx of labor required during construction activities. This plan outlines strategies for effective recruitment, housing, transportation, and worker welfare to manage the human resource aspect of the project efficiently. Additionally, it takes into account the potential impacts of labor influx on the local community and the environment and provides mitigation measures.

Recruitment and Workforce Management:

Skilled and unskilled labor will be recruited based on project requirements.

Recruitment will prioritize local labor, and efforts will be made to provide training and capacity-building for local workers.

Housing and Accommodation:

Adequate accommodation facilities will be provided for both migrant workers.

Accommodation will meet safety, hygiene, and comfort standards.

Transportation:

Safe and efficient transportation arrangements will be made to bring in labor from outside the project area.

Transportation will adhere to local and national traffic regulations.

Worker Welfare:

Workers' well-being will be a priority, and measures will be implemented to ensure fair labor practices, safe working conditions, and fair remuneration.

Compliance with occupational health and safety standards will be mandatory.

Community Engagement:

Contractor will engage with the local community to address potential concerns related to labor influx.

Regular communication channels will be established to address community feedback and ensure transparency.

Mitigation of Negative Impacts:

Measures will be put in place to mitigate potential negative impacts associated with labor influx, such as increased demand for local services and goods, competition, congestion, and environmental pressures.

Community awareness campaigns will educate workers and the local community about responsible behavior and potential risks.

Compliance with Labor Laws:

Contractor will fully comply with labor laws and regulations in Malawi, ensuring that labor practices are fair, safe, and non-discriminatory.

Efforts will be made to promote equal pay and fair remuneration.

Health and Safety:

Compliance with approved occupational health standards will be required to ensure labor operates in a protected environment.

First aid facilities and medical support will be available to address any health issues.

Monitoring and Reporting:

Regular monitoring of labor influx management measures will be conducted to ensure their effectiveness.

Any incidents or issues related to labor will be documented and addressed promptly.

Conclusion:

The Labor Influx Management Plan reflects projects commitment to managing the influx of labor in a responsible and ethical manner while prioritizing the well-being and welfare of both the workforce and the local community. By implementing these comprehensive measures and adhering to labor laws and regulations, aim to create a harmonious and productive work environment. This plan will be regularly reviewed and adapted as needed to address specific labor-related needs and concerns, fostering a positive and equitable working environment for all.

ANNEX 4.12. GENDER-BASED VIOLENCE (GBV) REPORTING PROTOCOL

Introduction:

The Gender-Based Violence (GBV) Reporting Protocol for the construction of Benga - Dwangwa M005 road section outlines the procedures and mechanisms for reporting and addressing incidents of gender-based violence within the project environment. This protocol is vital in ensuring a safe, respectful, and inclusive workplace for all employees, contractors, and stakeholders involved in the project.

Code of Conduct and Conditions of Service:

A comprehensive code of conduct will be established and signed by all workers, clearly outlining acceptable behavior and expectations.

Conditions of service will be transparently communicated to employees to ensure awareness of disciplinary issues and applicable standards.

Equal Opportunities and Non-Discrimination:

The project will provide equal opportunities to all employees regardless of gender, ensuring that both women and men have equitable access to employment and advancement.

Discrimination of any form will not be tolerated, and employees will be educated about the importance of non-discrimination.

Grievance Redress Mechanism:

An effective grievance redress mechanism will be put in place, allowing individuals to report incidents of GBV, harassment, or discrimination confidentially and without fear of reprisal.

Complaints will be addressed promptly, and appropriate actions will be taken in accordance with established procedures.

Sensitization and Awareness:

Regular sensitization programs and awareness campaigns will be conducted to educate workers about the disadvantages of sexual harassment and gender-based violence.

Information, Education, and Communication (IEC) materials on GBV will be made available to raise awareness and provide resources for reporting.

Reporting and Investigation:

Reporting channels for GBV incidents will be clearly defined, and designated personnel will be responsible for receiving and handling reports.

Investigations will be conducted impartially, respecting the confidentiality and privacy of all parties involved.

Support and Counseling:

Victims of GBV will be provided with access to support services and counseling to help them cope with the emotional and psychological impact of such incidents.

Referrals to external support organizations will be made when necessary.

Anti-Retaliation Measures:

Strict anti-retaliation measures will be in place to protect individuals who report GBV incidents.

Whistleblower protection will be provided to ensure the safety of those who come forward.

Monitoring and Compliance:

Regular monitoring and evaluation will be conducted to ensure compliance with the GBV Reporting Protocol.

The effectiveness of awareness campaigns and the grievance redress mechanism will be assessed, and necessary improvements will be made.

Conclusion:

The GBV Reporting Protocol is a fundamental component of the projects commitment to creating a safe and inclusive work environment during the construction of Benga - Dwangwa M005 road section . By implementing these measures and adhering to the protocol, this aims to prevent and address gender-based violence and harassment effectively. This plan will be regularly reviewed and adapted as needed to ensure a workplace free from GBV and supportive of all employees.

ANNEX 4. 13. WATER RESOURCES PROTECTION AND MANAGEMENT PLAN

Introduction:

The Water Resources Protection and Management Plan for the construction of Benga - Dwangwa M005 road section outlines the strategies and measures to ensure the responsible use and protection of water resources during the construction phase. This plan focuses on preventing pollution, managing runoff, and safeguarding aquatic ecosystems to mitigate potential environmental and health risks.

1. Pollution Prevention:

Strict guidelines will be established to prevent pollution of water sources during construction.

All construction materials, chemicals, and waste will be stored and managed in a way that minimizes the risk of contamination.

2. Waste Management:

Comprehensive waste management procedures will be implemented to prevent construction waste from entering water drainage systems.

All waste will be collected, separated, and disposed of in accordance with local regulations and environmental standards.

3. Runoff Management:

Measures will be taken to manage runoff from construction sites to prevent soil erosion and sedimentation in water bodies.

Sediment ponds, silt fences, and other erosion control structures will be installed as needed.

4. Protection of Aquatic Ecosystems:

Sensitive biological and ecological resources in and around water bodies will be identified and protected.

Buffer zones and protective measures will be established to ensure the well-being of aquatic ecosystems.

5. Emergency Response:

An emergency response plan will be in place to address any accidental spills or incidents that could potentially affect water resources.

Prompt actions will be taken to contain and mitigate the impact of such incidents.

6. Compliance with Regulations:

The project will adhere to all relevant local and national regulations related to water resources protection.

Necessary permits and approvals will be obtained as required.

7. Community Engagement:

The local community will be engaged and informed about the measures in place to protect water resources.

Awareness campaigns will educate the community about the importance of preserving water quality and aquatic ecosystems.

8. Reporting and Documentation:

Regular reporting and documentation of water quality, runoff management, and pollution prevention measures will be maintained.

Reports will be made available to relevant authorities and stakeholders.

Conclusion:

The Water Resources Protection and Management Plan underscores the project's commitment to responsible and sustainable construction practices during the development of Benga - Dwangwa M005 road section. By implementing these measures, aim to safeguard water resources, prevent pollution, and protect aquatic ecosystems. This plan

will be regularly reviewed and adapted as needed to ensure the continued protection of water resources and the environment throughout the construction phase.

ANNEX 4.14. NOISE AND VIBRATIONS MANAGEMENT PLAN

Introduction:

The Noise and Vibrations Management Plan for the construction of Benga - Dwangwa M005 road section outlines strategies and measures to effectively mitigate construction-related noise and vibrations. The objective is to minimize disturbance to the environment and surrounding communities while ensuring the safety and well-being of workers.

1. Noise Management Measures:

Scheduled Construction Hours: All construction works that generate significant noise will be conducted between 06:00 hours and 18:00 hours, avoiding nighttime construction to prevent disturbances to the surrounding community's sleep.

Maintenance of Machinery: All construction machinery and equipment will be regularly maintained according to manufacturer specifications and service manuals to reduce noise emissions. This includes routine checks and repairs to minimize excessive noise.

Use of Noise Control Devices: Noise-producing machinery and equipment will be equipped with noise control devices, where possible, to reduce noise emissions during operation.

Personal Protective Equipment (PPE): Workers operating noisy machinery will be provided with appropriate personal protective equipment (PPE) such as ear muffs to protect their hearing.

2. Vibration Management Measures:

Safe Operating Procedures: Construction machinery and equipment will be operated in accordance with safe procedures to minimize ground vibrations. Operators will be trained in vibration control techniques.

Maintenance and Calibration: Machinery and equipment used for pile driving or other activities generating ground vibrations will be regularly maintained and calibrated to ensure minimal vibration impact.

3. Noise Complaint Handling:

A mechanism will be established for receiving and addressing noise-related complaints from the surrounding community. Complaints will be promptly investigated and resolved.

4. Monitoring and Documentation:

Noise levels and vibration measurements will be routinely monitored and documented to ensure compliance with established limits and standards.

5. Worker Sensitization:

Workers will be sensitized to the importance of switching off engines and equipment when not in use to reduce unnecessary noise emissions.

6. Community Engagement:

The local community will be informed of the construction schedule and noise mitigation measures to manage their expectations and minimize disruptions.

Conclusion:

The Noise and Vibrations Management Plan demonstrates the projects commitment to responsible construction practices during the development of Benga - Dwangwa M005 road section. By implementing these measures, aim to minimize noise and vibrations that could disturb the environment and surrounding communities. This plan will be continually monitored and adjusted as necessary to ensure compliance and minimize the impact of noise and vibrations.

ANNEX 4.15. EROSION AND SEDIMENT CONTROL MANAGEMENT PLAN (ESC MP)

Introduction:

The Erosion and Sediment Control Management Plan (ESC MP) for the construction of Benga - Dwangwa M005 road section outlines strategies and measures to effectively control soil erosion and prevent sedimentation in nearby water bodies during construction activities. The primary goal is to protect the environment, preserve natural vegetation, and safeguard water quality.

1. Vegetation and Soil Preservation:

Contractor will be committed to environmental conservation and will avoid unnecessary cutting down of trees and the removal of natural vegetative cover, which can contribute to soil erosion.

2. Prohibition on Waterway Contamination:

A strict prohibition will be enforced against activities such as washing vehicles or changing lubricants in waterways or wetlands to prevent contamination and sedimentation.

3. Protection of Water Resource Systems:

All construction operations will be carefully planned and executed to prevent erosion or degradation of water resource systems. This includes considerations for both physical and chemical aspects that may affect aquatic habitats.

4. Erosion and Sediment Control Plan (ESCP):

Measures such as silt fences, sediment basins, and erosion control blankets will be used as needed to contain soil erosion and sediment.

5. Regular Monitoring and Inspection:

Routine monitoring and inspection will be conducted to ensure the effectiveness of erosion and sediment control measures.

Any necessary adjustments or improvements will be made promptly to address any issues that arise.

6. Compliance with Environmental Regulations:

The project will adhere to all relevant local and national environmental regulations related to erosion and sediment control.

Necessary permits and approvals will be obtained as required.

7. Community Engagement:

The local community will be informed of the erosion and sediment control measures in place to prevent soil erosion and protect water bodies.

Awareness campaigns will educate the community about the importance of preserving the environment and water quality.

Conclusion:

The Erosion and Sediment Control Management Plan (ESC MP) underlines the projects commitment to responsible construction practices during the development of Benga - Dwangwa M005 road section. By implementing these measures, aim to control erosion, prevent sedimentation, and protect both the environment and water quality. This plan will be continually monitored and adjusted as necessary to ensure compliance and minimize the impact of erosion and sedimentation.

ANNEX 4.16. SEXUAL HARASSMENT PREVENTION AND RESPONSE PLAN

Introduction:

The Sexual Harassment Prevention and Response Plan for the construction of Benga - Dwangwa M005 road section outlines a comprehensive approach to creating a safe and respectful workplace by preventing and addressing sexual harassment. The plan underscores the commitment to maintaining a work environment free from harassment and discrimination.

1. Policies and Objectives:

The project establishes clear policies and objectives to prevent sexual harassment, promote respect, and ensure equal treatment for all workers.

2. Prevention Measures:

Regular training and awareness campaigns will be conducted to educate all project personnel about sexual harassment, its prevention, and the importance of respectful behavior.

3. Reporting Mechanisms:

A confidential and accessible reporting system will be established to allow victims or witnesses of sexual harassment to report incidents without fear of retaliation.

4. Investigation Procedures:

Transparent and impartial investigation procedures will be in place to ensure that all reported incidents are thoroughly investigated. The process will prioritize the privacy and dignity of all parties involved.

5. Response Actions:

Appropriate actions will be taken against individuals found responsible for sexual harassment. These actions may include disciplinary measures, counseling, or termination, depending on the severity of the offense.

6. Support for Victims:

Victims of sexual harassment will be provided with support, including access to counseling and legal assistance if necessary. Their well-being and confidentiality will be prioritized.

7. Community Engagement:

The local community will be informed of the project's commitment to preventing sexual harassment and fostering a respectful work environment.

8. Compliance with Legal Requirements:

The project will adhere to all relevant local and national laws and regulations related to the prevention and response to sexual harassment.

Conclusion:

The Sexual Harassment Prevention and Response Plan is a vital component of the project's commitment to ensuring a safe and respectful workplace on the Benga - Dwangwa M005 road section construction project. By implementing these measures and policies, aim to prevent sexual harassment, respond promptly and effectively to incidents, and provide support to victims. This plan will be continually monitored and adjusted as necessary to ensure compliance and maintain a harassment-free work environment.

ANNEX 4.18. STAKEHOLDERS ENGAGEMENT PLAN (SEP)

Introduction:

The Stakeholders Engagement Plan (SEP) for the construction of Benga - Dwangwa M005 road section outlines the commitment to effective communication and engagement with all relevant stakeholders. This plan reflects the dedication to collaboration, transparency, and addressing concerns to ensure a successful project.

1. Identification of Stakeholders:

Contractor will identify and categorized all project stakeholders, including local communities, government agencies, and other entities with a vested interest in the project.

2. Stakeholder Assessment:

A thorough assessment of stakeholder interests, concerns, and expectations has been conducted. This information will guide project planning and implementation to align with stakeholder needs.

3. Grievance Redress Committee:

An effective workers' grievance redress committee will be established to allow workers to report concerns, complaints, or issues related to the project. This committee will ensure timely responses and grievance resolution.

4. Communication and Engagement Strategies:

Tailored communication and engagement strategies have been developed for each stakeholder group to ensure effective and meaningful interactions.

5. Periodic Reporting:

Contractor will provide regular reports on stakeholder engagement activities, feedback received, and actions taken to address concerns. These reports will be shared with relevant authorities and the public to maintain transparency and accountability.

6. Conflict Resolution Mechanisms:

Mechanisms for conflict resolution will be in place to address disputes that may arise during the project. These mechanisms will prioritize fair and equitable resolution.

7. Community Consultations:

The plan includes provisions for community consultations and engagement to gather input from local communities, incorporate their perspectives into decision-making, and address their concerns.

Conclusion:

The Stakeholders Engagement Plan (SEP) is a vital component of the projects commitment to effective communication and collaboration with all relevant stakeholders. By implementing these strategies, aim to foster transparency, address concerns, and ensure that the project benefits both the community and the environment. This plan will be continually monitored and adjusted as necessary to uphold the commitment to stakeholder engagement and satisfaction.

ANNEX 5: WATER QUALITY ASSESSMENT

Second Phase Baseline and Environmental Status (Surface Water Quality Assessment) for M5 Road Construction Project Area – Nkhotakota





December, 2023

Specialist Team Members (Surface Water Quality Assessment)

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1.0 INTRODUCTION

1.1 Background to the M5 project and a need for water quality assessment

The water quality assessment is an important component of the Environmental and Social Impact Assessment (ESIA) report for any big construction project in line with the Environmental laws and policies. According to the Environment Management Act (EMA) of 2017, the construction of major roads in Malawi must undergo an ESIA study. Furthermore, as prescribed by the Guidelines for Environmental and Social Impact Assessment (ESIA) in Malawi (1997), it is important to assess water sources within an area where the project is to take place. This is done to determine the baseline data of the water resources surrounding the project area, and also to identify mitigation factors.

The Government of Malawi through the Roads Authority (RA), with support from the African Development Bank (AfDB), is planning to rehabilitate M5 road section of Benga to Dwangwa in Nkhota-kota District. During this project, major works shall include rehabilitation and widening to a 7 m carriageway and 2 m width sealed shoulders and upgrade drainage structures. It is likely that before, during and after implementation of the M5 Road Project, impacts on the river and its riparian buffer zones exist or can arise attributed to other anthropogenic or natural activities, siltation, clearance of vegetation, excessive water use, illegal waste disposal and alteration of natural hydrology. Following EMA (2017) and ESIA (1997) guidelines, this study, therefore, forms an integral part of the ESIA report for this M5 Road project to assess the environmental and water quality status of the major rivers and streams. This component of the ESIA study, therefore, was aimed at determining the second baseline and environmental status (water quality assessment) of the surface water sources in the area where the M5 Road project will be implemented.

1.2 Specific Objectives

Specifically, the work was performed to achieve the following objectives

- a) To assess the environmental status (second baseline data) of the surface water quality within the vicinity of the M5 road construction project along the lakeshore (Benga to Dwanga) in Nkhotakota District,
- b) To determine and monitor the existing and potential sources of contamination to the surface water sources within the road construction project site,
- c) To prepare the second baseline water quality report and identification of the potential impacts of the M5 Road Construction project and their possible mitigation factors,

2.0 MATERIALS AND METHODS

2.1. Study setting – Hydrology and drainage

The second water quality assessment component for the EIA report was conducted from 30th November to 2nd December 2023 along the M5 road in Nkhotakota district located in the central region of Malawi (Figure 1). The district covers an area of 4,259 km² and has a population of 28,350 (NSO,2018). Nkhotakota district lies within a latitude 12° 55' 00" S and 34° 18' 00" E longitude and at an elevation of 712 meters above sea level. It is 200 km from Lilongwe (Malawi's capital city). Nkhotakota has a tropical savanna climate with a wet and dry season and fairly constant temperatures that increase slightly in October. The district is hot and warm and experiences temperature variations of between 67°F and 91°F. The mean annual temperature is 26. 16°C. Nkhotakota is located along the shore of Lake Malawi.

To assess the second phase status of water quality of streams and rivers within with the M5 Road construction project, and to monitor possible existing sources of contamination to these surface water sources, the following major streams and rivers were studied: Mikongwe, Liwaladzi, Dwangwa, Chikwale, Chizeu, Msenjere, Navunde, Bua, Khako, Kasangazi, Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia, Navikoko, and Lipyozi. The majority of these rivers and streams are perennial and cross the M5 road along the lakeshore.

2.2 Study Design and Sample Collection

To assess the second phase quality of the surface water sources and establish baseline water quality data along M5 Road, experimental research design and qualitative methods were used. The design of sampling programmes and sampling techniques were

performed in line with the Malawi Bureau of Standards (MS 682-1:2002). Water samples were collected from 19 major rivers along the M5 road (Table 2). Sampling sites were purposively selected upstream of each river close to the road bridge. The samples were collected in triplicate (a, b and c) from each site (upstream). Four sets of samples were collected for various measurements as shown in Table 1:

Table 1: Sampling framework and water quality parameters measured

Sets	Point of Analysis/action	Water Quality parameters analyzed
Set 1	On-site	pH, Total dissolved solids (TDS), electrical conductivity (EC), dissolved oxygen (DO), water temperature, and flow rate
Set 2	On-site/Laboratory	Microbiological analysis: <i>Fecal coliform</i> (FC) and E-Coli
Set 3	Laboratory	Anions: sulphate (SO_4^{2-}), and phosphate (PO_4^{3-}), and Nitrate (NO_3^-)
Set 4	Laboratory	Cations (metals): calcium (Ca), magnesium (Mg) sodium (Na), and potassium (K).

Sampling sites, descriptions and coordinates of the major rivers are shown in Table 1. A total of 19 water samples were collected in triplicates and duplicates for analysis. Standard operating procedures and protocols were followed to collect, preserve and transport the water samples to avoid any cross-contamination and alteration of the samples (MS 682-1:2002, MS 682-3:2002; APHA 2011). Immediately after collection, all the samples were transported to INNORET Laboratory Satellite Centre and Malawi Central Government Water Laboratory in Lilongwe for laboratory work.

A Geographical Positioning System (GPS) hand receiver (GARMIN GPSMAP 60Cx) and Android Smart Phone GPS App (GPS Essentials) were used to locate and record the exact location of the sites. Furthermore, an observation Notebook was used to record information on water source characteristics. Water samples were collected using new and pre-cleaned polyethylene bottles.

Table 2: Sampling sites description and coordinates

SN	Sampling Code	Surface water source (River)	Site description	GPS Coordinates
1	S1U	Dwangwa	Upstream of Dwangwa river	621052.275, 8616323.284
2	S2U	Mikongwe	Upstream of Mikongwe	623763.641 8609672.933
3	S3U	Liwaladzi	Upstream of Liwaladzi river	626269.444, 8605703.243
4	S4U	Chikwale	Upstream of Chikwale river	625746.184, 8598596.056
5	S5U	Chizewo	Upstream of Chizeu river	626678.411, 8596161.067
6	S6U	Msenjere	Upstream of Msenjere river	627101.291, 8591556.454
7	S7U	Khako	Upstream of Khako river	628068.294, 8587627.605
8	S8U	Navunde	Upstream of Navunde river	627737.613, 8587111.960
9	S9U	Bua	Upstream of Bua river	629794.154, 8586323.297
10	S10U	Kasangadzi	Upstream of Kasangazi river	633239.544, 8582808.185
11	S11U	Lunga	Upstream of Lunga river	634640.607, 8580287.728
12	S12U	Kaombe	Upstream of Kaombe river	639415.108, 8573424.309
13	S13U	Mchandilo	Upstream of Mchandilo river	639418.758, 8569780.600
14	S14U	Ling'ona	Upstream of Ling'ona river	640546.825, 8567567.408
15	S15U	Chamakuwi	Upstream of Chamakuwi river	640783.112,

				8565052.664
16	S16U	Kanjamwano	Upstream of Kanjamwano river	641017.159, 8564489.269
17	S17U	Chia	Upstream of Chia River	643646.338, 8548589.033
18	S18U	Navikoko	Upstream of Navikoko river	639092.086, 8530286.825
19	S19U	Lipyodzi	Upstream of Lipyodzi river	638150.560, 8527112.959

S: Sampling site. **U:** upstream **GPS:** Global Positioning System

WATER QUALITY SAMPLE POINTS

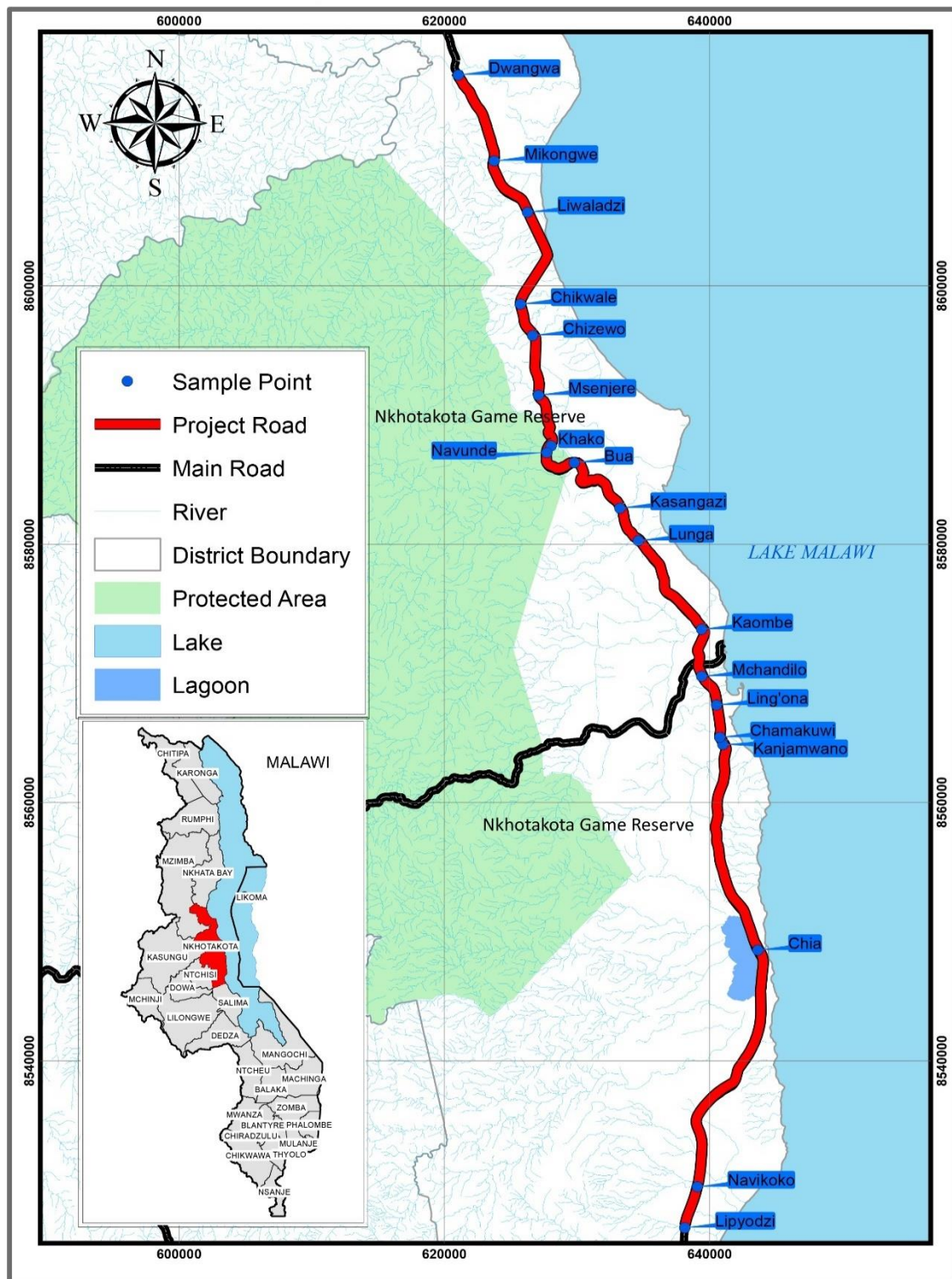


Figure 1: Map of the project area along M5 Road in Malawi

2.3. Analytical Methods and Water Quality Analyses

In this study, all reagents and chemicals used were of analytical grade. Distilled and de-ionized water was used in all dilutions, rinsing of apparatus and preparation of standard

solutions. The water quality assessment employed standard analytical methods, and the following physico-chemical water quality parameters were measured: pH, total dissolved solids (TDS), electrical conductivity (EC), dissolved oxygen (DO), water temperature, flow rate and discharge, calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), sulphate (SO_4^{2-}), Nitrate (NO_3^-), and phosphate (PO_4^{3-}). These parameters were purposively chosen as they considerably provide the baseline water quality status of any water source. The physico-chemical water quality parameters were also chosen to depict any possible source of contamination within the surrounding areas and along the M5 Road stretch.

A). On-site measurements: The pH, TDS, EC, water temperature, and DO were measured on site immediately after water sample collection. A portable pH multimeter (model no. 80, COM instrument, USA), first pre-calibrated with buffer solutions (pH 4.01 and 7.01), was used to measure the pH and water temperature values of all the water samples. The TDS (mg/L) and EC ($\mu\text{S}/\text{cm}$) were determined by EC/TDS meter (model no 80, COM instrument, USA). Before TDS/EC measurements, the meter was calibrated following standard procedures. The DO meter (Membrane electrode HI 9145), first pre-calibrated, was used to measure the DO of the water. Flowrate of the rivers were measured using a floating bottle. The surface velocities of the water were measured and multiplied by the widths and average depths of the rivers.

B). Laboratory measurements: The chemical parameters namely Ca, Mg, Na, K, NO_3^- , and PO_4^{3-} were analyzed at a certified laboratory using standard and well-established methods. Before analyses, all the laboratory and field equipment were washed thoroughly with distilled water and handled following standard procedures (APHA 2011). Water samples for metal analysis were preserved with concentrated hydrochloric acid (HCl) while that for anion analyses were preserved by cooling using ice packs placed in cooler boxes.

The sulphate and phosphate were determined by turbidimetric method with the aid of a UV-Vis spectrophotometer (INDIANMART MODEL). The sulphate and phosphate standard solutions and water samples were measured with the UV-spectrophotometer

at 430 nm and 880 nm wavelengths, respectively. The NO_3^- was determined using a Cadmium Reduction Method (8039) with the aid of a DR3900 photometer (APHA, 2011; Sandu et al, 2014). Standard NO_3^- solutions (0.01, 0.02, 0.25, 0.50, 1.00 and 2.00 mg/L NO_3^-) were prepared according to the standard procedure for the preparation of calibration curves. The nitrate analyses were performed with the aid of a DR3900 photometer. The metals (cations) namely Ca and Mg were measured using the atomic absorption spectrometry (AAS) method with the aid of an Atomic Absorption Spectrophotometer (Model AA500). The Na and K metals were measured using flame photometry with the aid of a flame photometer (Model 410).

2.4. Data Management and Statistical Analysis

For quality control and reliability of the water quality results, the water samples were collected in triplicates and duplicates and all procedures for both sample collection and analysis were made following standard methods (APHA, 2011). The design of sampling programmes, sampling techniques and the handling of water samples from rivers and streams for physical and chemical assessment were also employed by Malawi Bureau of Standards (MS 682-6:2012). Furthermore, sample analyses were made at reputable institutions where equipment and staff are certified. Descriptive statistics, such as minimum, maximum, averages and ranges, were performed using Microsoft Excel (2016).

3.0 RESULTS - BASELINE STATUS OF SURFACE WATER

3.1 Summary of results and interpretation - water quality assessment

The results of the water quality assessment for the surface water from the rivers and streams for two phases along M5 Road are given in Table 3 and Table 4 in the Appendices section. Additionally, figures 2, 3, 4 and 5, under Appendix 1 provide a summary of graphs that show the water quality status and spatial variations in various water quality parameters for the two phases of assessments. Figure 6 under Appendix 4 shows some pictures taken during fieldwork, water sample collection and on-site measurements.

The findings are discussed to report the current status of the surface water quality in the vicinity of the road construction project along the M5 Road. The results are also discussed to elucidate the existing sources of contamination to the surface water sources within the M5 Road construction project stretch. The results are being compared based on differences in the assessment periods (phase 1 and 2). There are no set standards for surface water quality (rivers, lakes, streams) in Malawi, hence the results are discussed with reference to other studies and standards elsewhere for natural waters. It was observed that during phase 2 of the assessment, two rivers (Liwaladzi and Chikwale) were completely dry hence, no samples were collected for the analysis. Further, some rivers including Chizewo, Chamakuwi, Mchandilo, Msenjere, Lipyodzi, and Navikoko were dry but had stagnant water in some points that was reported and observed to be used for watering crops grown along some of these rivers. Consequently, these rivers had zero flowrate and samples were collected from stagnant waters. In addition, there was bridge construction happening at Navikoko and Lipyodzi rivers.

a). Physico-chemical measurements

- The pH of the surface water samples for the first phase ranged from 5.80 to 7.50 with an average of 6.62. During the second phase, the surface water samples recorded pH values ranging from 6.07 to 8.00 with an average of 7.33 higher than what was recorded in phase 1. The comparative analysis on pH values between phase 1 and 2 identified that high pH values were recorded in all the rivers and streams during the second phase of the assessment than in the first phase. For the first phase, majority of the streams and rivers registered slightly acidic water sources (pH values below 7.0), with 6 rivers below the lower limit (6.5) of the recommended values of 6.5 to 8.5 for natural waters. However, the majority of the rivers and streams had pH values well within the recommended. For the second phase, all the rivers and streams were well within the recommended pH values (6.5 to 8.5) of natural waters. Only 3 rivers registered slightly acidic water sources (pH values below 7.0). Furthermore, the pH for all the rivers studied along the M5 road project site is comparatively within the MS214:2013 recommended limit (for treated drinking water) of pH 5.0–9.5 and that set by WHO (2017) (6.5–8.5). With respect to pH, no significant and

noticeable contamination or impact on the surface waters within the M5 road project stretch was noted.

- Regarding EC and TDS of surface water from the streams and rivers, during the first phase, the surface water samples had EC values ranged from 25 to 200.7 $\mu\text{S}/\text{cm}$ and TDS values ranged from 11.70 to 95.70 mg/L with the average values of 111.46 $\mu\text{S}/\text{cm}$ and 52.83 mg/L, respectively. During the second phase, EC values of the surface water samples ranged from 57.00 to 793.00 $\mu\text{S}/\text{cm}$ with an average value of 287.88 $\mu\text{S}/\text{cm}$ and TDS values ranged from 27.00 to 385.50 mg/L with an average TDS value of 138.80 mg/L. Higher EC and TDS values were recorded during the second phase compared to the first phase. The study identified that the higher TDS values during the second phase was attributed to natural sources such as leaching of soil nutrients, weathering of rocks and minerals. The EC and TDS are good indicators of pollution or contamination of water from streams and rivers as they indicate the presence of dissolved minerals, salts and organic matter. At most, freshwater can have 2000 mg/L of TDS, hence all the rivers studied were within the normal limits for natural waters in both phases. In streams and rivers, normal conductivity levels come from the surrounding geology and anthropogenic activities. From the results (changes/increase in EC and TDS levels between phase 1 and 2), it is evident that geology and anthropogenic activities are significantly affecting the water quality of the majority of rivers and streams.
- Dissolved oxygen (DO) is a measure of oxygen present and dissolved in water. Healthy water should generally have dissolved oxygen concentrations above 6.5-8 mg/L. However, for the survival of fishes and aquatic animals, the minimum level of DO necessary in the rivers and streams is 4 mg/L. During the first phase, the average DO values ranged from 2.1 to 8.60 mg/L with an average value of 5.67 mg/L. Except for 4 rivers (Kanjawano, Chia, Navikoko and Lipyozi), the rest of the rivers and streams appear to contain normal DO levels. During the second phase, the mean DO values ranged from 4.43 to 16.27 mg/L with an average value of 9.72 mg/L. Higher DO values were recorded during

the second phase assessment compared to the first phase. It was observed during sample collection that there was high growth of aquatic plants in most of the rivers and streams during the second phase which is evident to have attributed to the increase or high DO levels since aquatic plants removes carbon dioxide from the waters.

- The water temperatures values in the studied rivers along M5 road ranged from 25.10 to 32.10°C with an average of 29.1°C during the first phase and 24.23 to 28.13 °C with and average of 25.97 °C during the second phase. Moderate lower temperature values were recorded during the second phase compared to what was registered during the first phase. Although the surface water temperature is prone to significant changes depending on the weather of a particular location, the water temperature values reported in the rivers across the M5 road are within ranges of most natural waters (0 to 30 °C).
- The mean phosphate (PO_4^{3-}) values of the surface water ranged from 0.010 to 1.075 mg/L with an average 0.235 mg/L for the first phase and 0.111 to 1.037 mg/L with an average value of 0.426 for the second phase. Higher phosphate values were recorded during phase 2 of the assessment compared to phase 1. According to LEO EnviroSci Inquiry (2022), a river should not exceed 0.1 mg/L phosphates as excess levels can be harmful. Except 7 rivers and streams (Bua, Kasangadzi, Lunga, Chikwale, Ling'ona, Chamakuwi and Kanjamwano), the majority of the rivers and streams had phosphate levels above the normal range during the first phase. Contrary, during the second phase, all the rivers and streams had mean phosphate values above the recommended normal range. High phosphate values in rivers and streams is the evidence of poor agricultural practices in these areas.
- The mean sulphate (SO_4^{2-}) levels for the first phase ranged from 0 to 18.20 mg/L with an average of 6.68 mg/L and for the second phase it ranged from 2.47 to 168.50 mg/L with an average value of 19.96 mg/L. Higher sulphate levels were recorded during the second phase of the assessment than during the first phase. The changes in sulphate levels between phase 1 and 2 was evident to be

attributed to poor agricultural practices along the assessed rivers and streams. According to UNEP (1990) and Zak et al., (2021), freshwater SO_4^{2-} concentrations typically range from 0 to 630 mg L⁻¹ in rivers, from 0 to 250 mg L⁻¹ in lakes, and from 0 to 230 mg L⁻¹ in groundwater. Hence, all the streams and rivers were reported to have sulphate levels within the normal ranges for surface and natural waters sources.

- During the first phase, the nitrate levels in all streams and rivers ranged from 0.55 to 2.50 mg/L, with an average of 1.0 mg/L. During the second phase, all rivers and streams recorded nitrate levels less than 0.001 mg/L. According to LEO EnviroSci Inquiry (2022), nitrates in river water often range from 0.01-3.0 mg/L. From the results, it is evident that all streams and rivers were within the required ranges in both phases.
- Regarding cations (Na, K, Ca, and Mg) all the rivers and streams were well within the normal ranges in both phases, hence no noticeable and significant sources of contamination was reported. Rivers generally contain 1 – 2 mg/L Ca, but in lime areas rivers may contain as high as 100 mg/L Ca (Lenntech, 2022). The *concentration* Ca^{2+} ions in freshwater is found in a range of 0 to 100 mg/L. Typical freshwater Mg *levels* range from 5-50 mg/L (LEO EnviroSci Inquiry (2022)). Rivers generally contain about 2 – 3 mg/L K, and depend greatly on the type of aquifer sediments present (Lenntech, 2022). During the second phase all rivers and streams recorded very high Na levels of up to 420.00 mg/L.

b) Microbiological tests

- The presence of Fecal Coliform (FC) bacteria and Fecal Streptococci (FS) in streams and rivers reveal contamination by fecal material from human or animal sources. Use of contact with such waters can result in exposure to pathogenic bacteria often associated with fecal contamination. In the first phase assessment, FC ranged from 2 to *Too Numerous To Count* (TNTC) while the FS ranged from 0 to TNTC CFUs/ 100 mL. About 9 rivers including Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia, Navikoko and Lipyodzi rivers had

the lowest FC (0 CFUs/ 100 mL) and 10 rivers including Navunde, Lunga, Kaombe, Mchandilo, Ling'ona, Chamakuwi, Kanjamwano, Chia, Navikoko and Lipyodzi rivers had the lowest FS (0 CFUs/ 100 mL), hence considered not contaminated with any fecal matter at the time of the study. During the second phase, FC ranged from 0.00 to 1001 CFUs/100 mL with an average of 180 CFUs/100 mL while the FS ranged from 0.00 to 2190.00 CFUs/100 mL with an average counts of 833.06 CFUs/100 mL. Only Msenjere, Bua and Kaombe recorded 0 CFUs/100 mL, the majority of the rivers were contaminated with faecal coliforms. In addition, majority of the rivers and streams were FS contaminated except Kaombe which recorded 0 CFUs/100 mL. Comparatively, more rivers were found to be microbially contaminated during the second phase than the first phase. The high levels of FC during the first phase could be attributed to high anthropogenic and animal activities within the area plus increased run-off caused by the rampant rainfalls. While during the second phase, higher FC was attributed to animal activities as evident during sample collection.

Generally, the water quality baseline data and water quality status of the surface water sources (rivers) within the M5 road construction appear to be within the set limits except for Phosphate, FC and FS. Furthermore, based on the values obtained for the water quality assessment, the surface waters also appear to be suitable for other uses such as irrigation, farming recreation and industrial production. There were few noticeable and significant sources of contamination either within the project site or nearby water bodies during the time of the study.

c) Flowrate of the river

- *River discharge* and flow rate are a function of meteorological runoff (precipitation minus evaporation) and drainage basin area. Although discharge and flowrate measurements were problematic in many sites during the first phase due to the flooded sites and rampant rainfall at the time of sampling, the majority of the rivers and streams had flow rate values ranging from 0.21 m/s to 1.10 m/s with an average of 0.65 m/s. Contrary, during the second phase, majority of the rivers and streams had zero flowrate due to challenges of drying

up. However, on the rivers and streams that were evident to be flowing, the flowrate ranged from 0.01 to 0.02 m/s with an average of 0.007 m/s.

4.0 CONCLUSIONS AND RECOMMENDATIONS

Based on this study, the water quality status appears to be within the normal ranges despite the water being contaminated microbiologically (FS and FC) and having a high levels of phosphates. The baseline environmental (water quality) assessment results for all the major rivers and streams along the M5 Road noted the following key points:

- Usually, the water quality status (WQS) of the surface water sources (rivers across M5 road) was noted to be within limits for all parameters except phosphates, FS and FC which were generally high.
- The surface waters from all the rivers across M5 road (project site) also appear to be suitable for other purposes like irrigation, farming, recreation and industrial production, and water abstraction upon some treatment or otherwise.
- According to the water quality assessment results and on-site observations, it was noted that high phosphate levels at some sites were due to rains during the sampling time that promoted erosion, run-off and deposition of other contaminants into the rivers.
- Except for microbial contamination and phosphates, the environmental (water quality) assessment observed no noticeable impact of human and animal activities on surface water quality within the M5 Road project sites at the time of the study.

Water quality deterioration may occur from dust, gravel and road construction materials due to runoff. However, this will be considered minimal owing to the low disruption to the road embankments along the M5 road. It is anticipated the road construction will have zero or minimal microbiological contamination of the surface water sources along the M5 road. Recommendations and possible impacts on the surface water sources resulting from the road construction, among others, will be mitigated as follows:

- Proper waste management facilities to be provided in construction camps
- Disallow storage of chemicals within 100 m periphery of permanent watercourse or river or stream

- Contaminated runoff from storage areas needs to be captured in ditches or ponds.
- Apply sealing or binding materials in the case of major spills of hazardous materials (liquids).
- At specific locations (e.g. borrow pits and trig pillars and other excavation sites) where gravel and other construction materials will be collected, the collected surface waters will have to be contained and avoid spill-over into nearby rivers and streams.
- Provision of sufficient drains for easy drainage flow
- Protection of hillside and valley slopes through engineering and bioengineering measures
- Prevention of dumping of construction spoil and debris in streams and rivers

5.0 REFERENCES

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6.0 APPENDICES

Appendix 1: Results of water quality assessment for the surface water sources

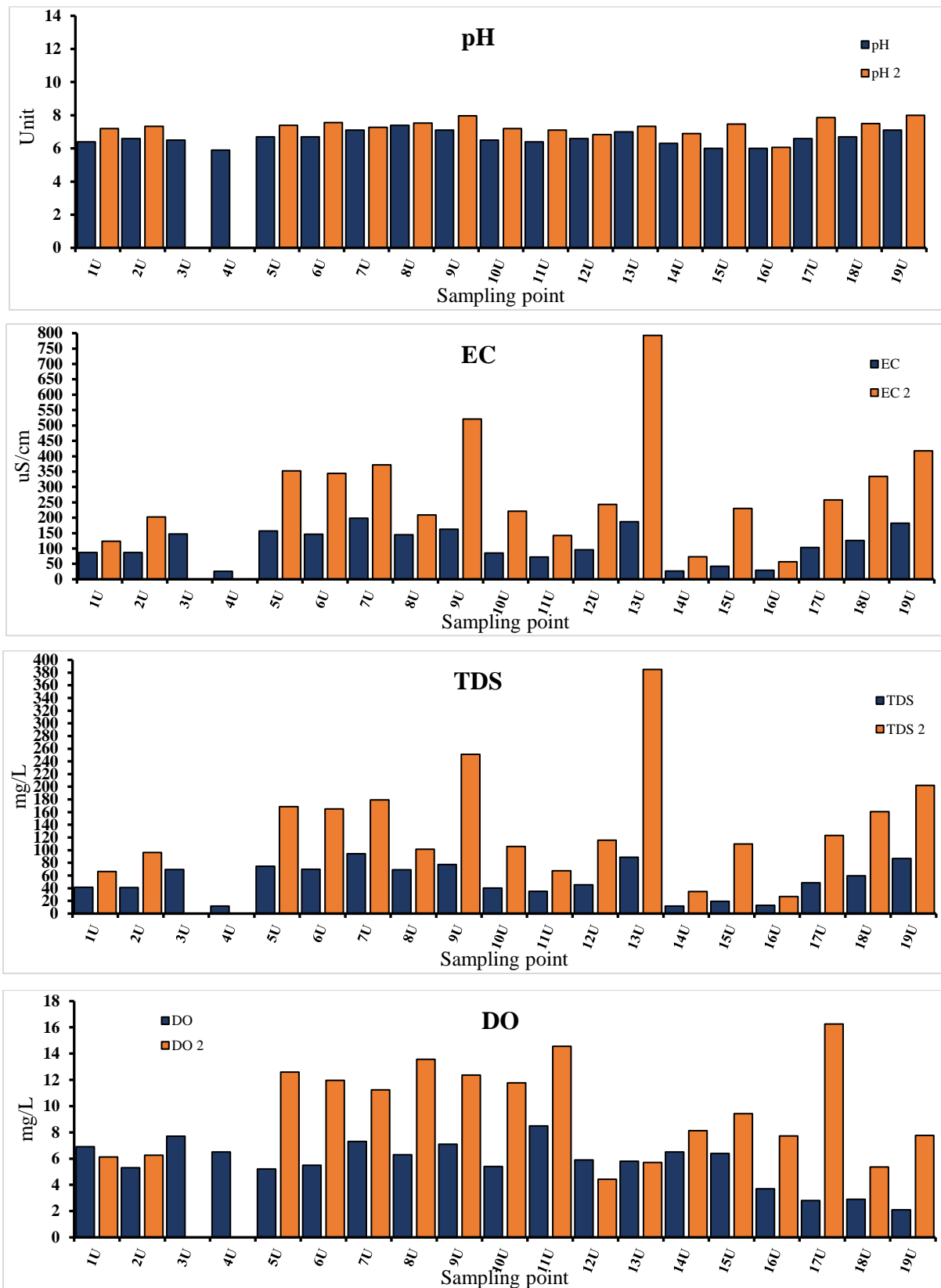


Figure 2: Water quality status and spatial variations in pH, EC, TDS and DO during first and second phases

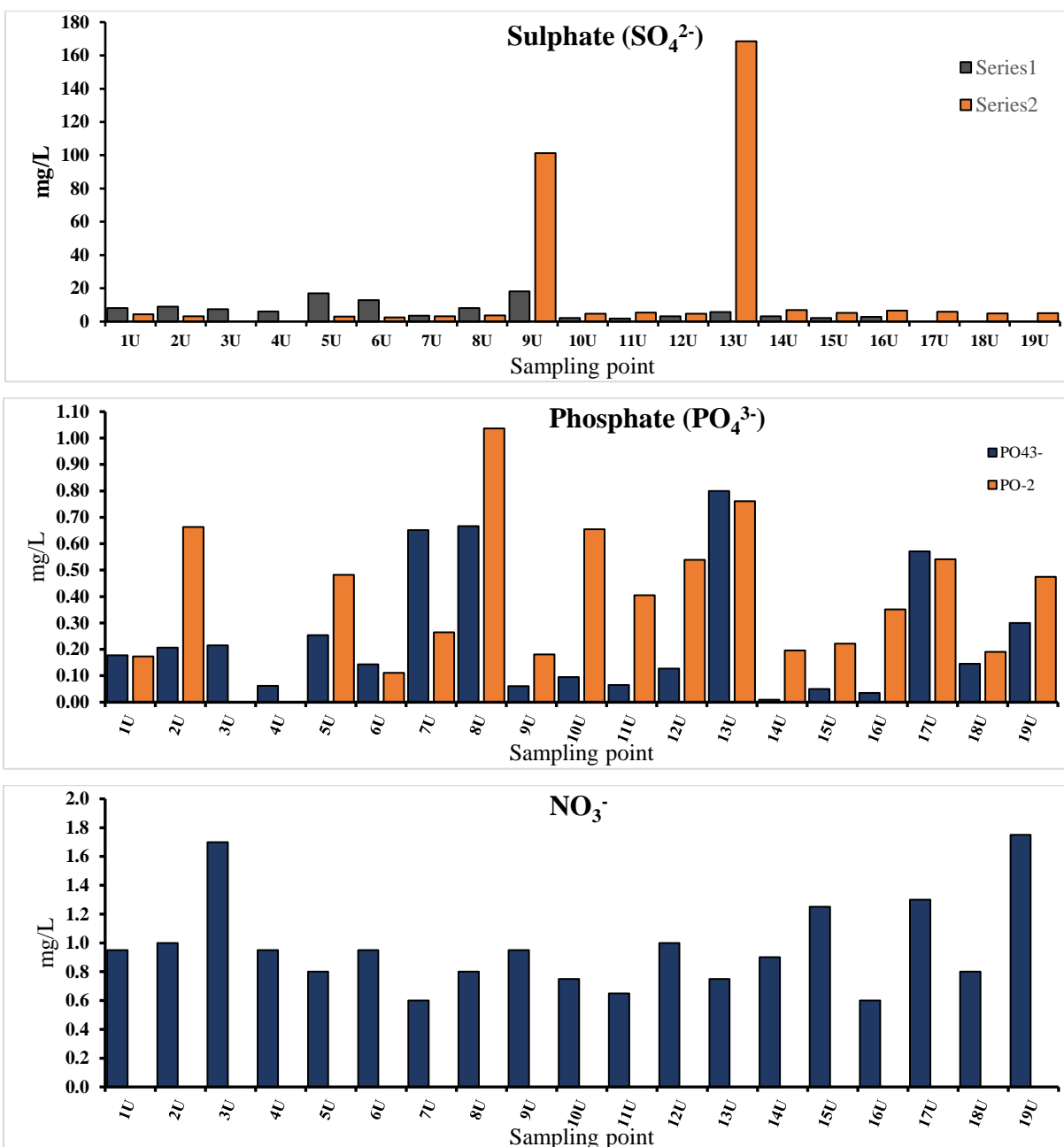


Figure 3: Water quality status and spatial variations in SO_4^{2-} , PO_4^{3-} , and NO_3^- during first and second phases

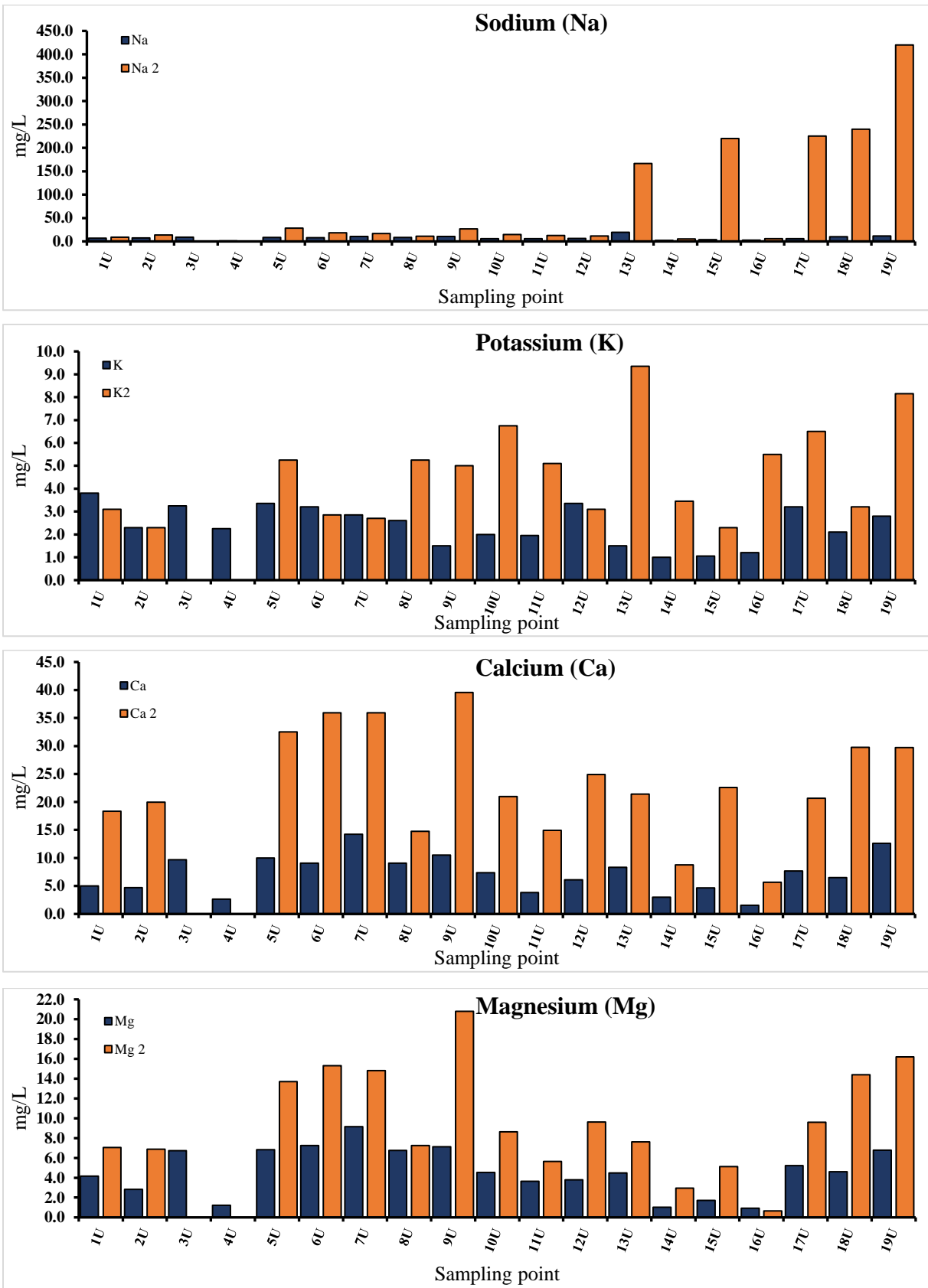


Figure 4: Water quality status and spatial variations in Na, K, Ca, and Mg first and second phases

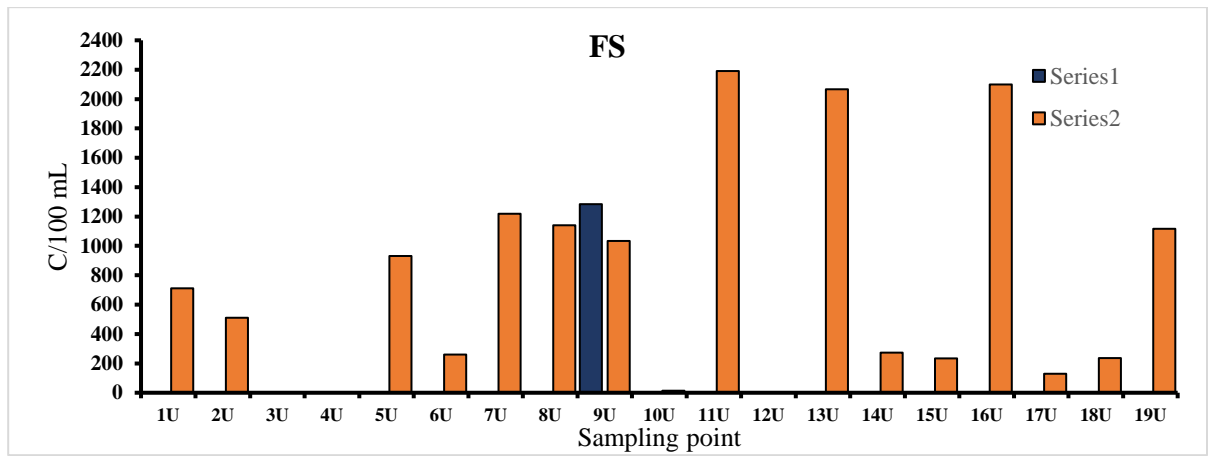
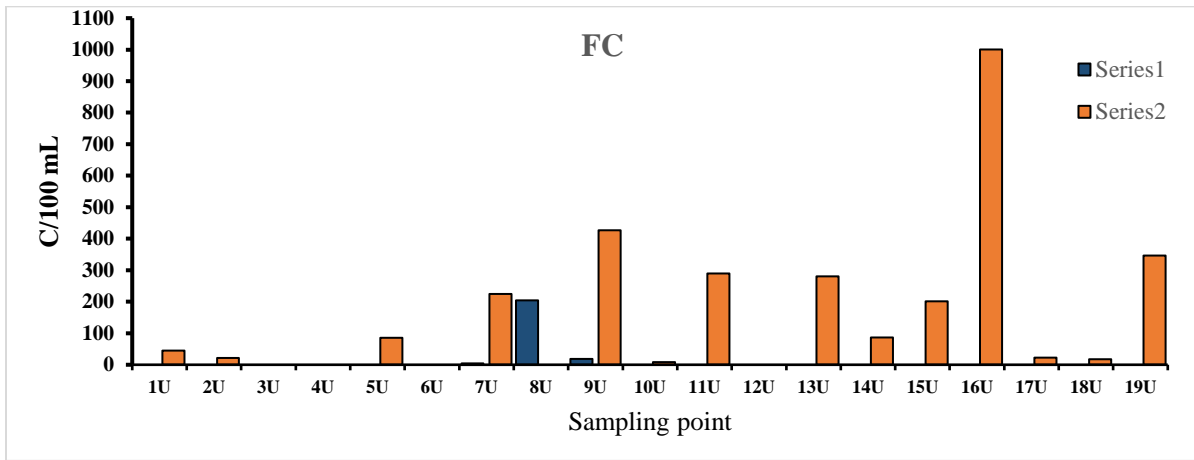


Figure 5: Water quality status and spatial variations in FC and FS during first and second phases

Table 3: A summary of water quality values (pH, EC, TDS, DO, temperature, Na, K, Ca, and Mg) during first and second phases

Sample ID	Surface water quality parameters																	
	pH		EC ($\mu\text{S}/\text{cm}$)		TDS (mg/L)		DO (mg/L)		Temperature ($^{\circ}\text{C}$)		Na (mg/L)		K (mg/L)		Ca (mg/L)		Mg (mg/L)	
	pH 1	pH 2	EC 1	EC 2	TDS 1	TDS 2	DO	DO 2	Temp 1	Temp 2	Na 1	Na 2	K 1	K2	Ca 1	Ca 2	Mg 1	Mg 2
1U	6.5	7.20	87.3	123.67	41.3	66.33	6.9	6.13	29.90	25.60	7.05	8.95	3.80	3.10	5.00	18.35	4.17	7.06
2U	6.4	7.33	87.00	202.33	41	96.33	5.3	6.27	25.10	27.47	7.65	13.80	2.30	2.30	4.71	19.96	2.83	6.87
3U	6.6	NM	147.00	NM	69.3	NM	7.7	NM	27.30	NM	8.75	NM	3.25	NM	9.71	NM	6.73	NM
4U	5.9	NM	25.70	NM	11.7	NM	6.5	NM	32.10	NM	1.25	NM	2.25	NM	2.65	NM	1.23	NM
5U	6.7	7.40	157.30	352.00	74.7	168.67	5.2	12.60	27.70	26.47	8.55	28.50	3.35	5.25	10.00	32.50	6.82	13.7
6U	6.7	7.57	146.70	344.33	69.7	165.00	5.5	11.97	27.10	26.70	7.85	18.35	3.20	2.85	9.08	35.95	7.25	15.3
7U	7.1	7.27	198.7	372.00	94.3	179.33	7.3	11.23	31.00	25.83	10.6	16.85	2.85	2.70	14.25	35.95	9.16	14.8
8U	7.1	7.53	145.00	209.00	69	101.33	6.30	13.57	25.80	25.13	8.7	10.90	2.60	5.25	9.08	14.75	6.77	7.255
9U	7.4	7.97	163.00	521.00	77.3	251.33	7.10	12.37	28.90	25.17	10.55	27.00	1.50	5.00	10.52	39.55	7.13	20.8
10U	6.5	7.20	85.7	221.67	40.3	105.67	5.4	11.77	30.3	24.23	5.70	14.50	2.00	6.75	7.36	20.95	4.52	8.635
11U	6.4	7.10	72.7	142.00	35	67.67	8.5	14.57	29.2	24.33	5.65	12.85	1.95	5.10	3.83	14.95	3.64	5.64
12U	6.6	6.83	96.3	243.00	45.3	115.67	5.9	4.43	29.2	24.60	6.15	11.85	3.35	3.10	6.08	24.90	3.78	9.63
13U	7	7.33	187.3	793.00	89	385.00	5.8	5.70	26.7	28.13	19.70	166.50	1.50	9.35	8.34	21.40	4.48	7.63
14U	6.3	6.90	26.7	73.33	12	34.67	6.5	8.13	31.7	26.27	2.15	5.35	1.00	3.45	2.99	8.78	1.04	2.955
15U	6.01	7.47	42	230.00	19.3	109.67	6.4	9.43	30.1	27.13	3.75	220.00	1.05	2.30	4.67	22.60	1.72	5.115
16U	6	6.07	29	57.00	13	27.00	3.7	7.73	30.5	24.30	2.75	5.90	1.20	5.50	1.56	5.68	0.92	0.65
17U	6.6	7.87	103.3	257.67	48.7	123.33	2.8	16.27	28.2	25.97	5.60	225.00	3.20	6.50	7.69	20.65	5.22	9.6
18U	6.7	7.50	125.7	334.67	59.7	160.67	2.9	5.37	28.3	26.20	9.90	240.00	2.10	3.20	6.51	29.75	4.60	14.4
19U	7.1	8	182.3	417.33	86.7	202.00	2.1	7.77	31.8	27.93	11.40	420.00	2.80	8.15	12.63	29.70	6.78	16.2
Min	5.90	6.07	25.70	57.00	11.70	27.00	2.10	4.43	25.10	24.23	1.25	5.35	1.00	2.30	1.56	5.68	0.92	0.65
Max	7.40	8.00	198.70	793.00	94.30	385.00	8.50	16.27	32.10	28.13	19.70	420.00	3.80	9.35	14.25	39.55	9.16	20.80
Average	6.61	7.33	110.98	287.88	52.49	138.80	5.67	9.72	28.99	25.97	7.56	85.08	2.38	4.70	7.19	23.32	4.67	9.78

U: upstream. 1: first phase. 2: second phase

DO: Dissolved Oxygen; **EC:** Electrical Conductivity; **TDS:** Total Dissolved Solids; **pH:** Power of Hydrogen; **Na:** Sodium; **K:** Potassium; **Ca:** Calcium; and **Mg:** Magnesium

NM: Not measured (the rivers were dry at the time of fieldwork)

Table 4: A summary of water quality values (FC, FS, PO₄³⁻, SO₄²⁻, and NO₃⁻) during first and second phases

Sample ID	Water Quality parameter									
	FC (CFUs/100 mL)		FS (CFUs/100 mL)		PO ₄ ³⁻ (mg/L)		SO ₄ ²⁻ (mg/L)		NO ₃ ⁻ (Mg/L)	
	First	Second	First	Second	First	Second	First	Second	First	Second
1U	TNTC	45.0	TNTC	711.0	0.18	0.173	8.13	4.35	0.950	<0.001
2U	TNTC	22.0	TNTC	510.0	0.21	0.664	9.00	3.24	1.000	<0.001
3U	TNTC	NM	TNTC	NM	0.22	NM	7.38	NM	1.700	NM
4U	TNTC	NM	TNTC	NM	0.06	NM	6.05	NM	0.950	NM
5U	TNTC	86.0	TNTC	932.0	0.25	0.482	16.96	3.06	0.800	<0.001
6U	TNTC	0.0	TNTC	261.0	0.14	0.111	12.96	2.47	0.950	<0.001
7U	4.0	225.0	TNTC	1218.0	0.65	0.265	3.52	3.18	0.600	<0.001
8U	204.0	0.0	0.0	1140.0	0.67	1.037	8.05	3.77	0.800	<0.001
9U	18.0	427.0	1284.0	1033.0	0.06	0.181	18.20	101.20	0.950	<0.001
10U	TNTC	8.0	TNTC	13.0	0.10	0.655	2.09	4.71	0.75	<0.001
11U	0.0	290.0	0.0	2190.0	0.07	0.405	1.90	5.45	0.65	<0.001
12U	0.0	0.0	0.0	0.0	0.13	0.539	3.17	4.71	1	<0.001
13U	0.0	281.0	0.0	2066.0	0.80	0.761	5.73	168.50	0.75	<0.001
14U	0.0	87.0	0.0	273.0	0.01	0.196	3.15	6.89	0.9	<0.001
15U	0.0	201.0	0.0	234.0	0.05	0.222	2.25	5.29	1.25	<0.001
16U	0.0	1001.0	0.0	2099.0	0.04	0.351	2.79	6.65	0.6	<0.001
17U	0.0	23.0	0.0	129.0	0.57	0.542	0.00	6.00	1.3	<0.001
18U	0.0	17.0	0.0	237.0	0.15	0.191	0.00	4.82	0.8	<0.001
19U	0.0	347.0	0.0	1116.0	0.30	0.475	0.00	5.00	1.75	<0.001
Min	4.0	0.00	1284	0.00	0.01	0.111	0.00	2.47	0.60	0.000
Max	TNTC	1001.00	TNTC	2190.00	0.80	1.037	18.20	168.50	1.75	0.00
Average	0.00	180.00	0.00	833.06	0.24	0.426	5.86	19.96	0.97	-

TNTC= Too numerous to count FC= Faecal coliforms, FS= Faecal streptococci, CFUs= Colony Forming Units. NM: Not measured



Figure 6: Pictures showing field work, water sample collection and on-site measurements

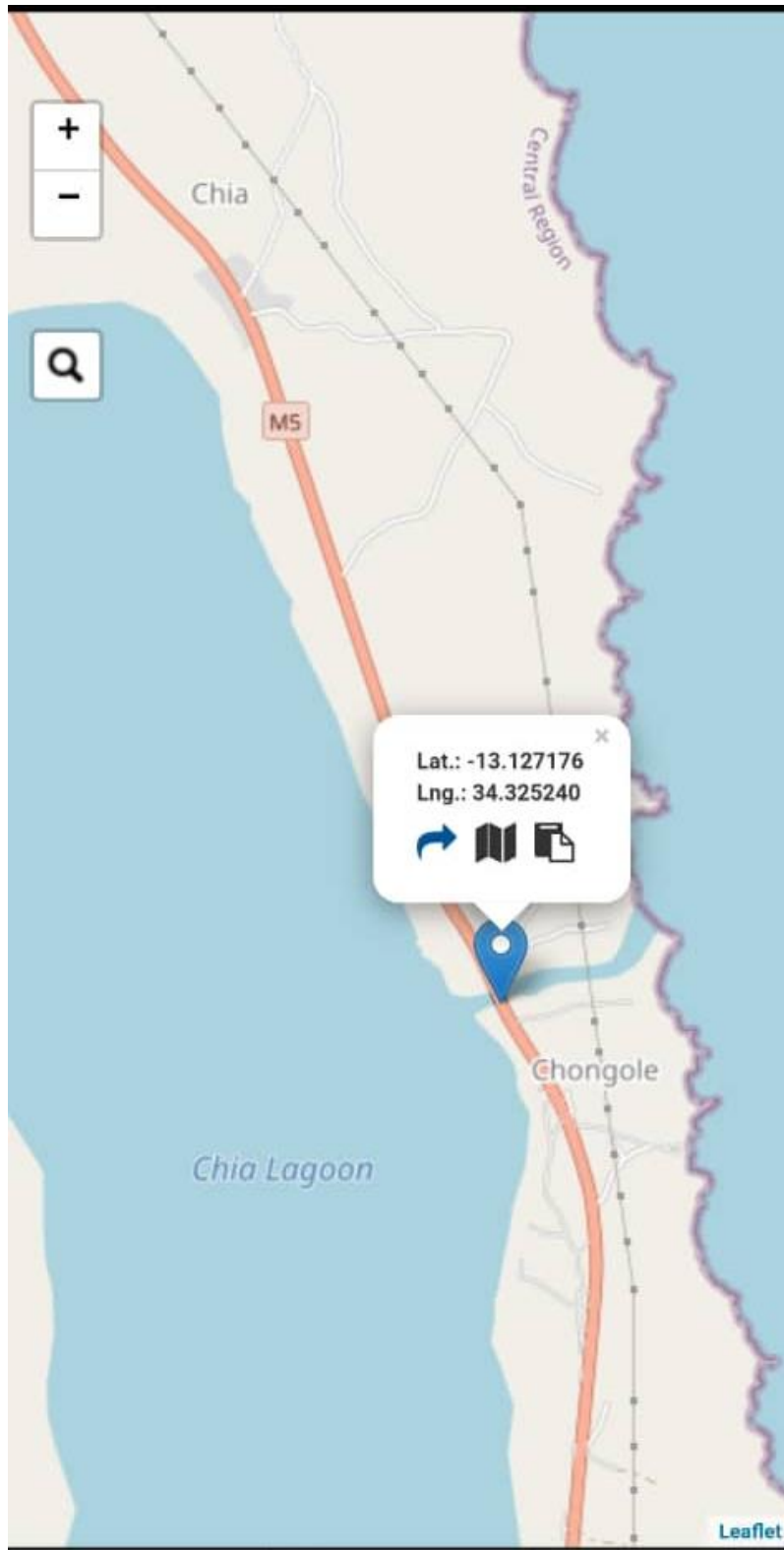
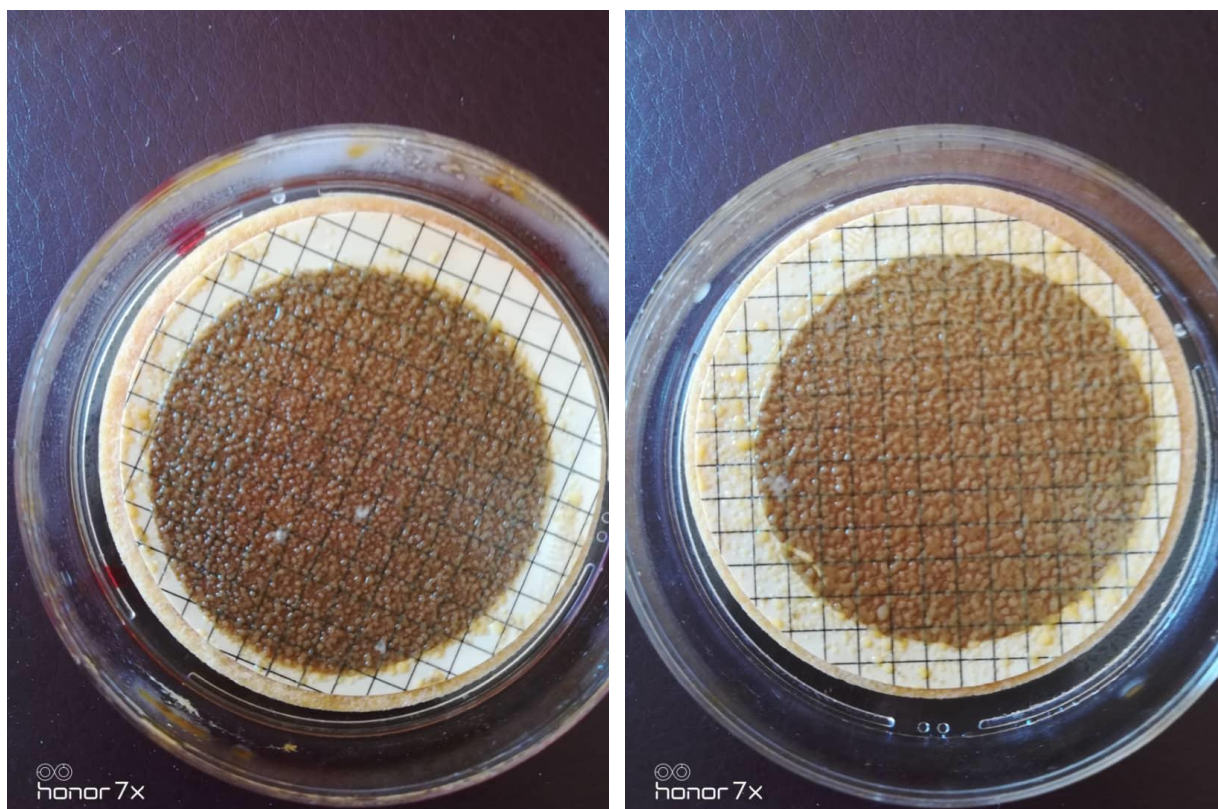


Figure 7: Pictures showing field map of Chia Lagoon sampling site



Figure 8: Pictures showing field work, water sample collection and on-site measurements



TNTC- Too numerous to count FC dish

Figure 9: Results of microbial content and results in the sampled rivers

6.0 APPENDICES

Appendix 1: Results of water quality assessment for the surface water sources

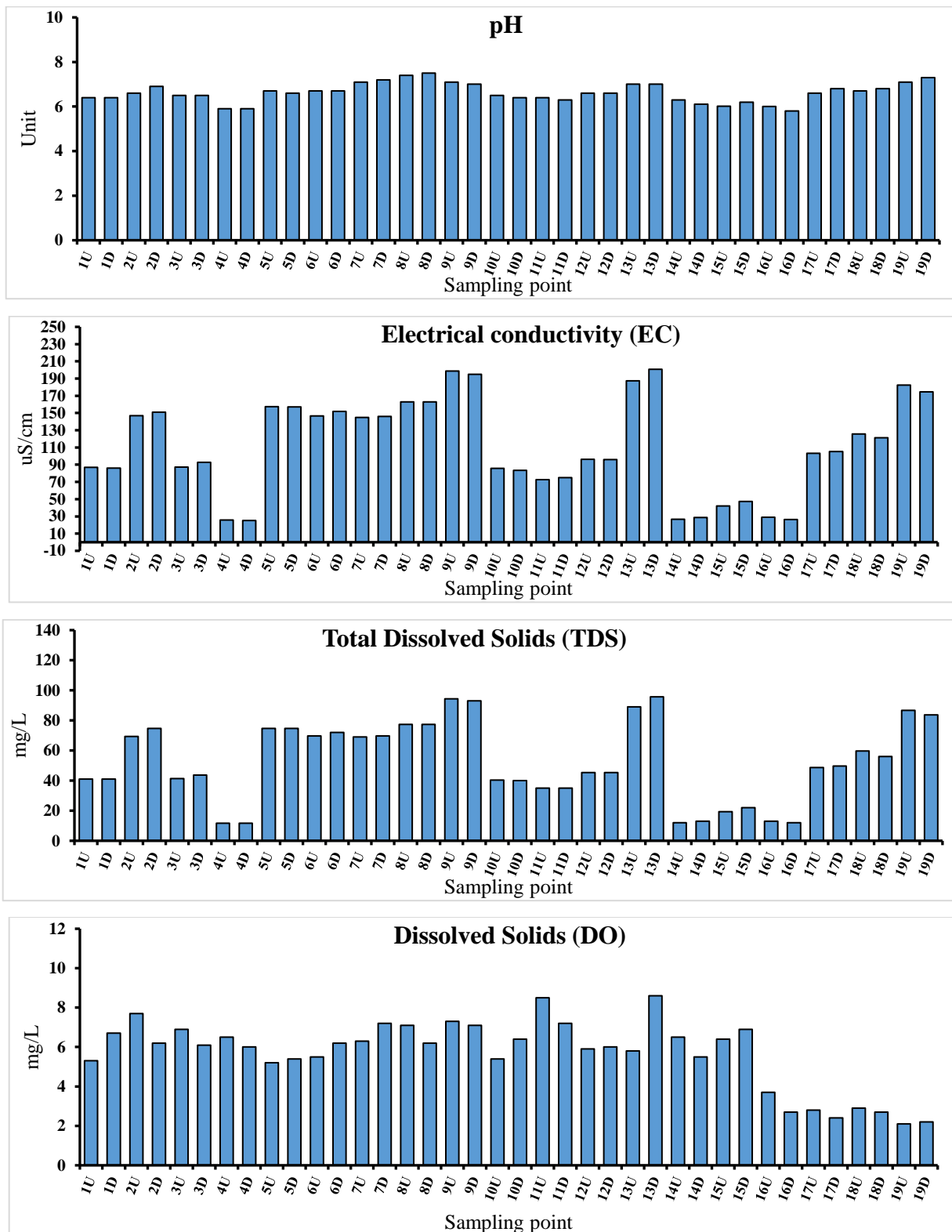


Figure 2: Water quality status and spatial variations in pH, EC, TDS and DO

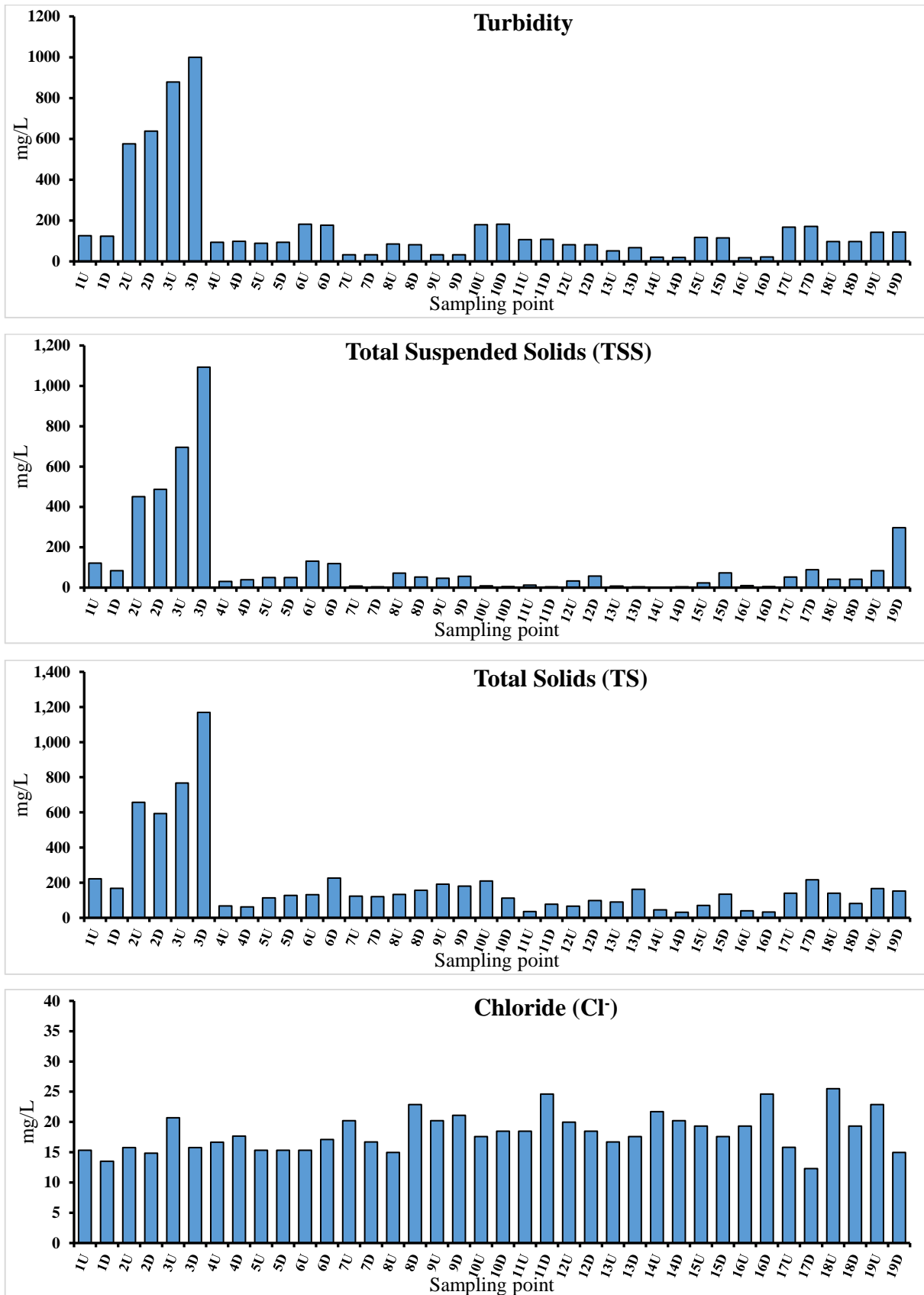


Figure 3: Water quality status and spatial variations in turbidity, TSS, TS and Cl⁻

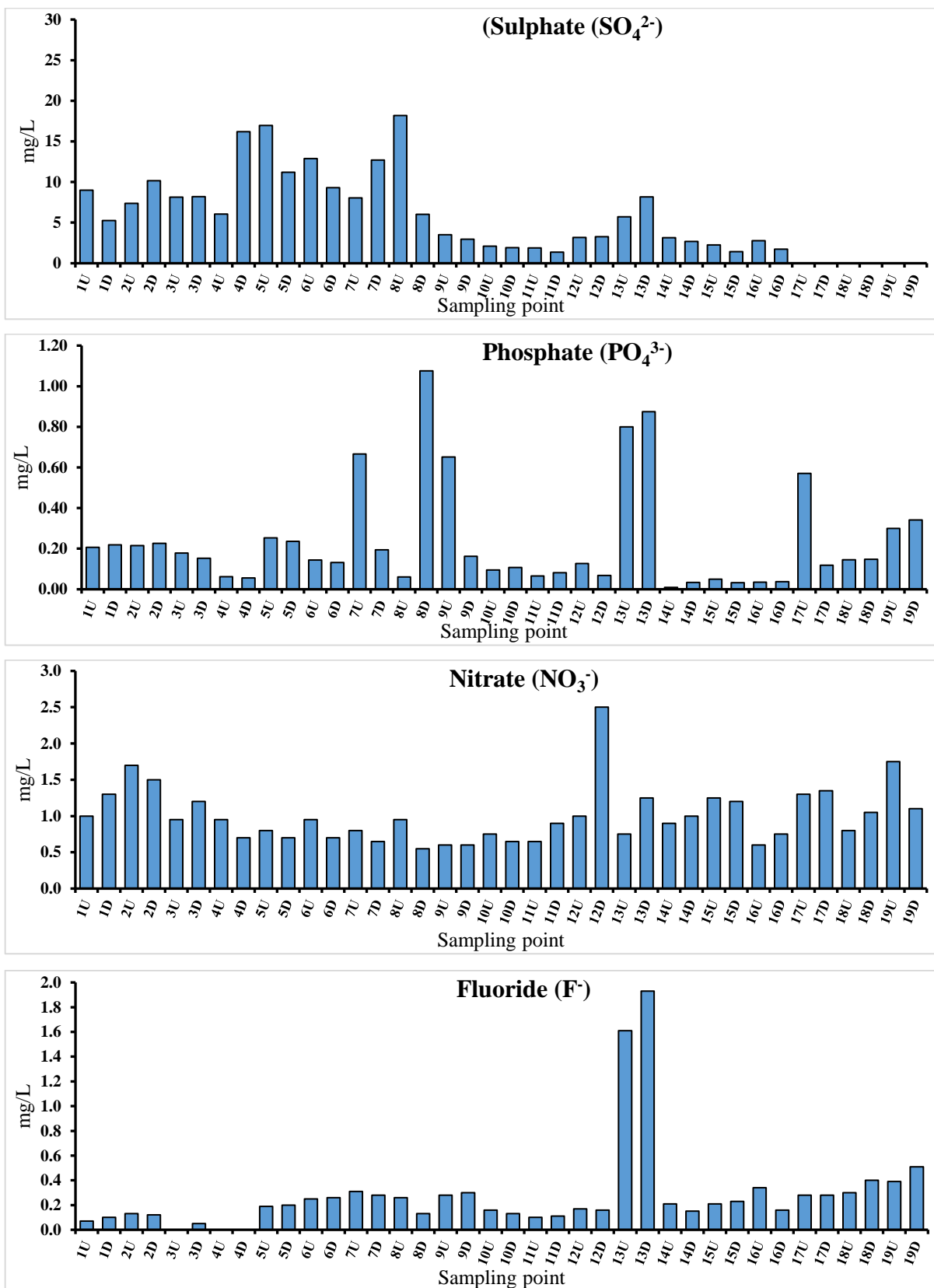


Figure 4: Water quality status and spatial variations in SO_4^{2-} , PO_4^{3-} , NO_3^- and F^-

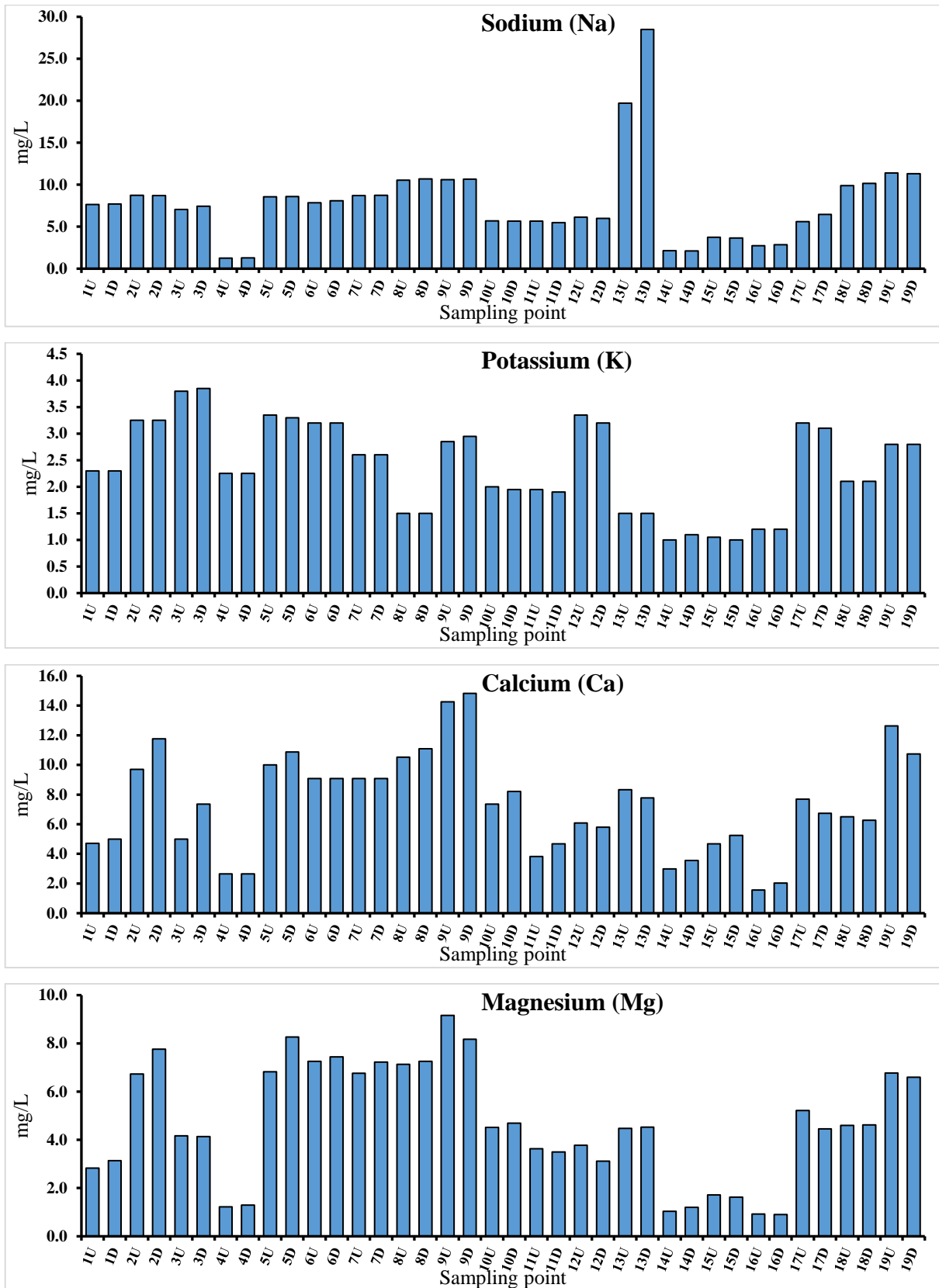


Figure 5: Water quality status and spatial variations in Na, K, Ca, and Mg

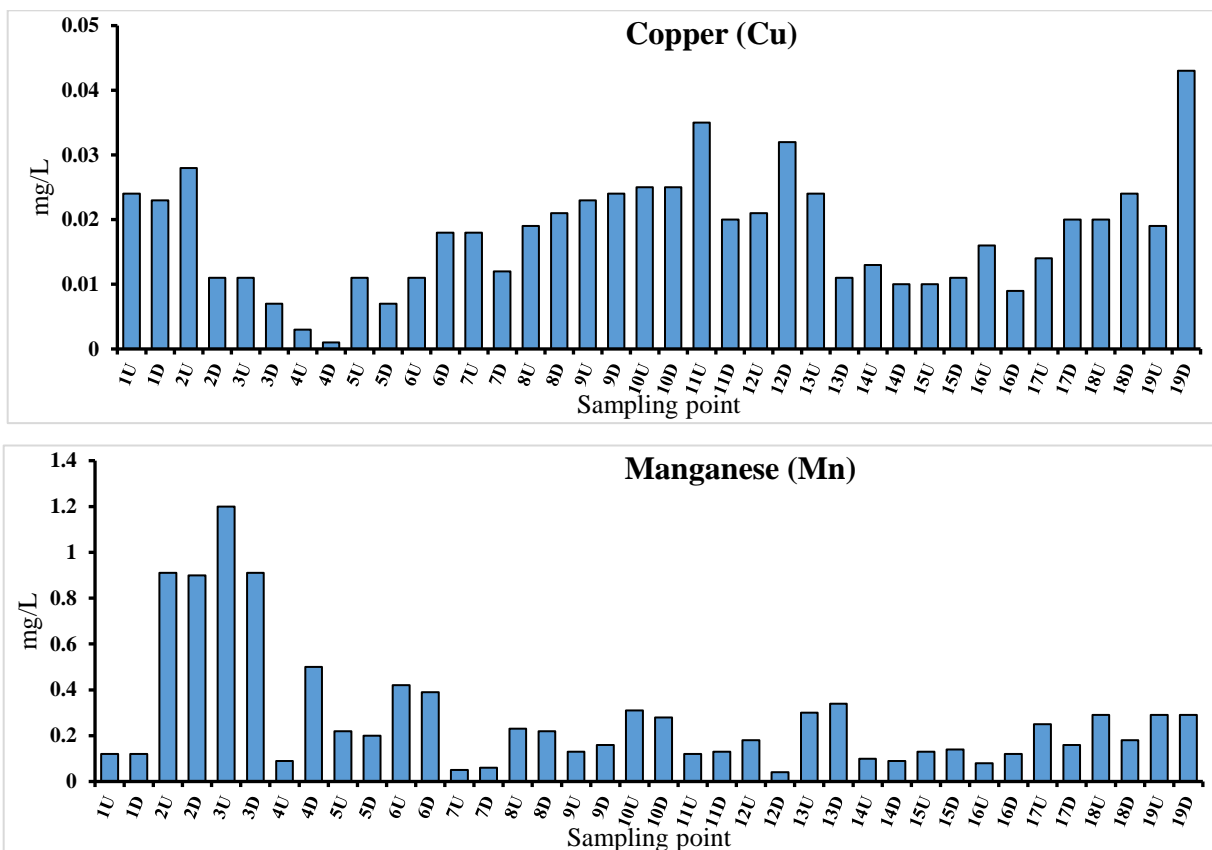


Figure 6: Water quality status and spatial variations in Cu and Mn

Table 3: A summary of water quality values (pH, EC, TDS, DO, temperature, turbidity, Na, K, Ca, Mg, Cd, Cu, Pb, Mn)

Sample ID	Surface water quality parameters													
	pH	EC ($\mu\text{S/cm}$)	TDS (mg/l)	DO (mg/l)	Temperature ($^{\circ}\text{C}$)	Turbidity (NTU)	Na (mg/l)	K (mg/l)	Ca (mg/l)	Mg (mg/l)	Cd (mg/L)	Cu (mg/l)	Pb (mg/L)	Mn (mg/l)
1U	6.4	87	41	5.3	25.1	126	7.65	2.30	4.71	2.83	<0.00	0.024	<0.01	0.12
1D	6.4	86	41	6.7	26.4	123.3	7.70	2.30	5.00	3.14	<0.00	0.023	<0.01	0.12
2U	6.6	147	69.3	7.7	27.3	575.7	8.75	3.25	9.71	6.73	<0.00	0.028	<0.01	0.91
2D	6.9	151	74.7	6.2	28.5	637.7	8.70	3.25	11.77	7.76	<0.00	0.017	<0.01	0.90
3U	6.5	87.3	41.3	6.9	29.9	879.3	7.05	3.80	5.00	4.17	<0.00	0.017	<0.01	1.20
3D	6.5	92.7	43.7	6.1	27.3	1000	7.45	3.85	7.36	4.14	<0.00	0.007	<0.01	0.91
4U	5.9	25.7	11.7	6.5	32.1	93.6	1.25	2.25	2.65	1.23	<0.00	0.003	<0.01	0.09
4D	5.9	25.3	11.7	6.0	30	98.8	1.30	2.25	2.65	1.30	<0.00	0.003	<0.01	0.50
5U	6.7	157.3	74.7	5.2	27.7	89.1	8.55	3.35	10.00	6.82	<0.00	0.017	<0.01	0.22
5D	6.6	157	74.7	5.4	28.3	93	8.60	3.30	10.88	8.27	<0.00	0.007	<0.01	0.20
6U	6.7	146.7	69.7	5.5	27.1	182.3	7.85	3.20	9.08	7.25	<0.00	0.017	<0.01	0.42
6D	6.7	152	72	6.2	27.6	177.3	8.10	3.20	9.08	7.45	<0.00	0.018	<0.01	0.39
7U	7.1	145	69	6.3	25.8	32.9	8.70	2.60	9.08	6.77	<0.00	0.018	<0.01	0.05
7D	7.2	146	69.7	7.2	26.5	33.1	8.75	2.60	9.08	7.23	<0.00	0.012	<0.01	0.06
8U	7.4	163	77.3	7.1	28.9	85.5	10.55	1.50	10.52	7.13	<0.00	0.019	<0.01	0.23
8D	7.5	163	77.3	6.2	29.3	81.4	10.70	1.50	11.10	7.25	<0.00	0.023	<0.01	0.22
9U	7.1	198.7	94.3	7.3	31	32.5	10.60	2.85	14.25	9.16	<0.00	0.023	<0.01	0.13
9D	7.0	195	93	7.1	29.7	32.6	10.65	2.95	14.83	8.17	<0.00	0.024	<0.01	0.16

10U	6.5	85.7	40.3	5.4	30.3	180	5.70	2.00	7.36	4.52	<0.00	0.025	<0.01	0.31
10D	6.4	83.3	40	6.4	31.5	182	5.65	1.95	8.22	4.69	<0.00	0.025	<0.01	0.28
11U	6.4	72.7	35	8.5	29.2	107.3	5.65	1.95	3.83	3.64	<0.00	0.035	<0.01	0.12
11D	6.3	75	35	7.2	28.4	108.3	5.50	1.90	4.67	3.50	<0.00	0.020	<0.01	0.13
12U	6.6	96.3	45.3	5.9	29.2	81.4	6.15	3.35	6.08	3.78	<0.00	0.02	<0.01	0.18
12D	6.6	96	45.3	6.0	29.4	81.5	6.00	3.20	5.80	3.12	<0.00	0.032	<0.01	0.04
13U	7.0	187.3	89	5.8	26.7	52	19.70	1.50	8.34	4.48	<0.00	0.024	<0.01	0.30
13D	7.0	200.7	95.7	8.6	28.9	67.3	28.50	1.50	7.77	4.53	<0.00	0.017	<0.01	0.34
14U	6.3	26.7	12	6.5	31.7	20.8	2.15	1.00	2.99	1.04	<0.00	0.013	<0.01	0.10
14D	6.1	28.7	13	5.5	31.8	19.5	2.10	1.10	3.55	1.20	<0.00	0.010	<0.01	0.09
15U	6.0	42	19.3	6.4	30.1	118	3.75	1.05	4.67	1.72	<0.00	0.010	<0.01	0.13
15D	6.2	47.3	22	6.9	31.5	115.3	3.65	1.00	5.24	1.62	<0.00	0.017	<0.01	0.14
16U	6.0	29	13	3.7	30.5	18.2	2.75	1.20	1.56	0.92	<0.00	0.016	<0.01	0.08
16D	5.8	26.3	12	2.7	29.6	22.1	2.85	1.20	2.03	0.90	<0.00	0.009	<0.01	0.12
17U	6.6	103.3	48.7	2.8	28.2	168.3	5.60	3.20	7.69	5.22	<0.00	0.014	<0.01	0.25
17D	6.8	105.3	49.7	2.4	29.3	171	6.45	3.10	6.74	4.46	<0.00	0.020	<0.01	0.16
18U	6.7	125.7	59.7	2.9	28.3	97.5	9.90	2.10	6.51	4.60	<0.00	0.020	<0.01	0.29
18D	6.8	121.3	56	2.7	28	96.9	10.15	2.10	6.27	4.62	<0.00	0.024	<0.01	0.18
19U	7.1	182.3	86.7	2.1	31.8	142.7	11.40	2.80	12.63	6.78	<0.00	0.019	<0.01	0.29
19D	7.3	174.7	83.7	2.2	31.6	143.7	11.30	2.80	10.75	6.60	<0.00	0.043	<0.01	0.29
min	5.80	25.30	11.70	2.10	25.10	18.20	1.25	1.00	1.56	0.90	<0.00	0.00	<0.01	0.04
max	7.50	200.70	95.70	8.60	32.10	1000.00	28.50	3.85	14.83	9.16	<0.00	0.04	<0.01	1.20

averag	6.6	111.46	52.83	5.67	29.07	167.58	7.84	2.38	7.35	4.70	<0.00	0.02	<0.01	0.28
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Table 4: A summary of water quality values (FC, FS, TSS, TS, Cl, PO₄³⁻, SO₄²⁻, NO₃⁻, and F-)

Sample ID	Water Quality parameter								
	FC (CFUs/100 ml)	FS (CFUs/100 ml)	TSS (mg/L)	TS (mg/L)	Cl ⁻ (mg/L)	PO ₄ ³⁻ (mg/L)	SO ₄ ²⁻ (mg/L)	NO ₃ ⁻ (mg/L)	F ⁻ (mg/L)
1U	TNTC	TNTC	121	222	15.31	0.207	9.00	1.00	0.07
1D	TNTC	TNTC	83	168	13.51	0.219	5.26	1.30	0.10
2U	TNTC	TNTC	451	658	15.76	0.215	7.38	1.70	0.13
2D	TNTC	TNTC	487	593	14.86	0.227	10.17	1.50	0.12
3U	TNTC	TNTC	696	767	20.71	0.178	8.13	0.95	<0.02
3D	TNTC	TNTC	1093	1169	15.76	0.152	8.21	1.20	0.05
4U	TNTC	TNTC	31	68	16.66	0.062	6.05	0.95	<0.02
4D	TNTC	TNTC	39	62	17.67	0.056	16.21	0.70	<0.02
5U	TNTC	TNTC	50	113	15.31	0.254	16.96	0.80	0.19
5D	TNTC	TNTC	50	127	15.31	0.236	11.20	0.70	0.20
6U	TNTC	TNTC	132	132	15.31	0.144	12.88	0.95	0.25
6D	TNTC	TNTC	119	226	17.11	0.132	9.29	0.70	0.26
7U	204	0	8	124	20.22	0.667	8.05	0.80	0.31
7D	2	0	4	120	16.70	0.195	12.70	0.65	0.28
8U	18	1284	72	132	14.95	0.061	18.20	0.95	0.26
8D	44	1218	52	156	22.86	1.075	6.01	0.55	0.13

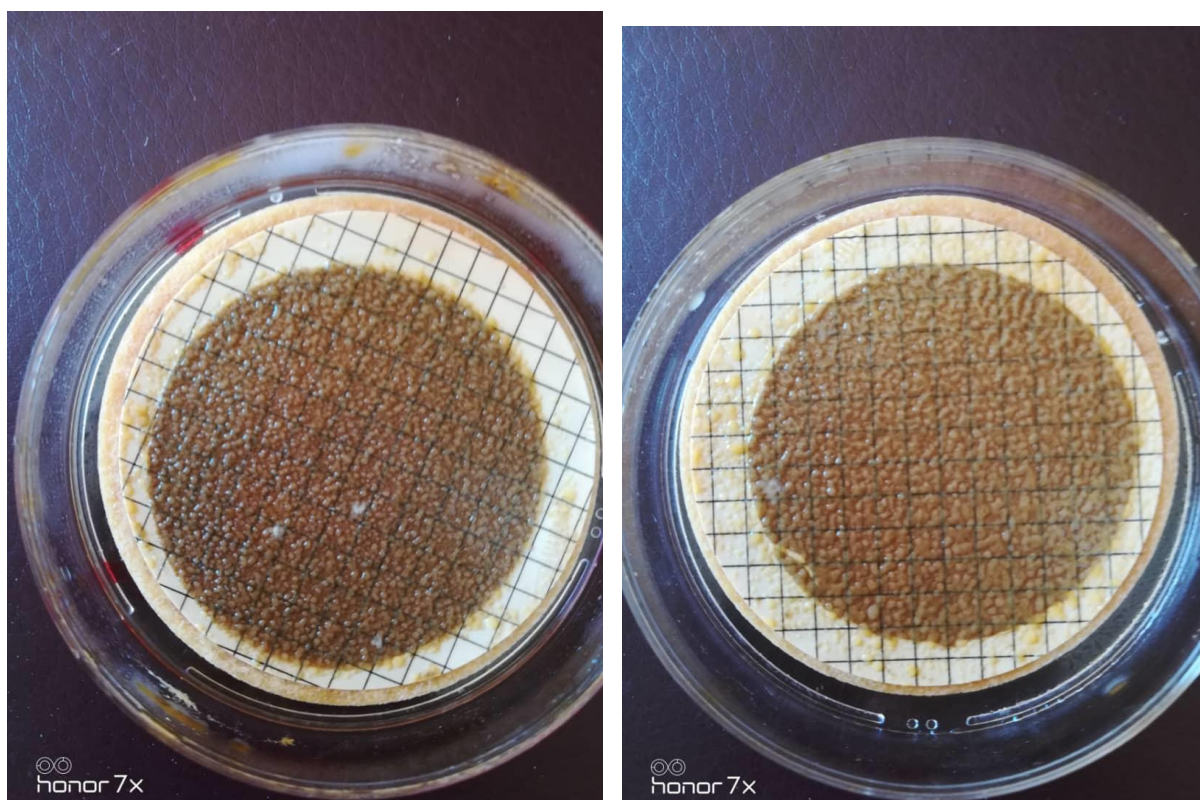
9U	4	TNTC	47	192	20.22	0.652	3.52	0.60	0.28
9D	TNTC	TNTC	56	180	21.10	0.163	2.97	0.60	0.30
10U	TNTC	TNTC	9	210	17.58	0.096	2.09	0.75	0.16
10D	TNTC	TNTC	5	112	18.46	0.107	1.93	0.65	0.13
11U			13	36	18.46	0.065	1.90	0.65	0.10
11D	8100	1780	4	78	24.62	0.082	1.36	0.90	0.11
12U			33	66	19.95	0.127	3.17	1.00	0.17
12D	4320	3180	57	98	18.46	0.068	3.27	2.50	0.16
13U			8	90	16.70	0.800	5.73	0.75	1.61
13D	1950	0	4	162	17.58	0.875	8.17	1.25	1.93
14U			2	46	21.70	0.010	3.15	0.90	0.21
14D	15,750	0	4	32	20.22	0.034	2.69	1.00	0.15
15U			23	70	19.34	0.050	2.25	1.25	0.21
15D	14,250	0	73	134	17.58	0.032	1.42	1.20	0.23
16U			10	39	19.34	0.036	2.79	0.60	0.34
16D	5,150	0	6	33	24.62	0.038	1.74	0.75	0.16
17U			53	140	15.82	0.571	nd	1.30	0.28
17D	200	0	89	216	12.31	0.118	nd	1.35	0.28
18U			41	140	25.50	0.145	nd	0.80	0.30
18D	21,000	0	41	82	19.34	0.148	nd	1.05	0.40
19U			84	166	22.86	0.300	nd	1.75	0.39
19D	35,100	0	297	152	14.95	0.341	nd	1.10	0.51

min	2	0	2	32	12.31	0.010	0.00	0.55	<0.02
max	TNTC	TNTC	1093	1169	25.50	1.075	18.20	2.50	1.93
Average	0	0	117	192	18.28	0.235	6.68	1.00	0.31

TNTC= Too numerous to count FC= Faecal coliforms, FS= Faecal streptococci, CFUs= Colony Forming Units



Figure 7: Pictures showing field work, water sample collection and on-site measurements



TNTC- Too numerous to count FC dish

Figure 8: Results of microbial content and results in the sampled rivers

ANNEX 7: PROFILE OF THE CONSULTANCY

PROFESSIONAL STAFF - Key Experts			
Name of Staff	HIGHEST QUALIFICATION	Area of Expertise	Position
Tommy Wakana Kamanga	<ul style="list-style-type: none"> • Master of Science in Forest and Environment Management • Master of Science in Global Sanitation. • Bachelor's Degree in Environmental Management, 2013 	Environment	Environmental Specialist Team Leader
Lwana Palwendo Kamanga	<ul style="list-style-type: none"> • Master of Management in Public Management Beijing Normal University, 2019. • Bachelor of Social Science (Economics, Sociology), • University of Malawi, Chancellor College, 2010 	Social	Social Specialist
Isaac Tchinga Mzengeze	<ul style="list-style-type: none"> • M.Eng. in Transport Studies, University of Cape Town, 2021. • BSc in Civil Engineering 	Civil Engineer	Project Engineer
Non-key experts			
Stella Chanza	Bachelor of Education (Humanities) – History and English Major	Editor / Language Specialist	Report editing
David Mtekateka	Bachelor of Science in Agriculture with option in Agricultural Engineering- 2012, University of Malawi, Bunda College.	Field Coordinator	Involved in conducting and coordinating stakeholder consultations and preparing stakeholder consultation reports.